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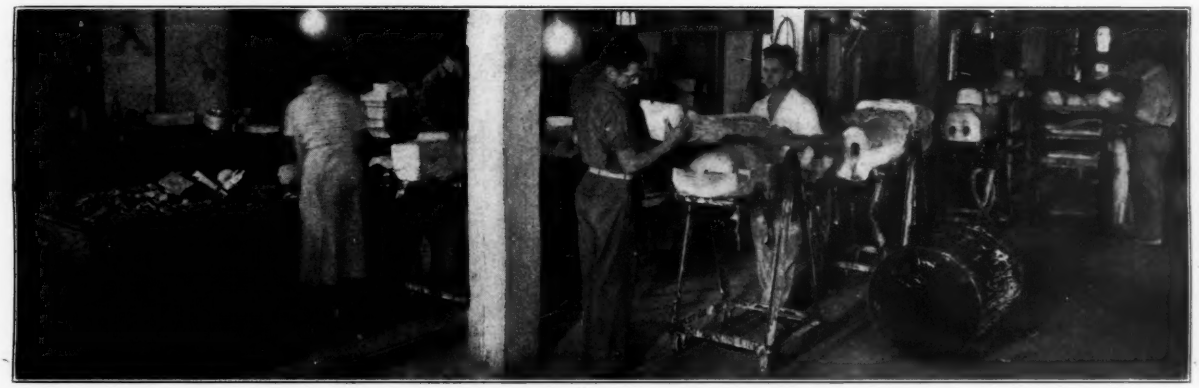
Latex Aids Sculptural Art

New Developments and Applications of Latex That Open New Fields for Rubber

D. C. McRoberts



A Portion of the Fabricating Department of the Rubber Displays, Inc., Plant Showing Operators Removing Mannequin Torso from the Mold after Vulcanization

T. W. WHITTLESEY, formerly director of the General Laboratories of the United States Rubber Co., once said, "Rubber is perhaps the most marvelous raw material made use of in any industry. It is not difficult to think of a material with great strength, another that is elastic, still others that are tough, waterproof, etc., but no other than rubber has such a combination of widely varying property possibilities; altogether there are more eggs in one basket than with any other raw material."

To this fact is due the remarkable application of rubber to innumerable uses and the almost phenomenal growth of the rubber industry during the past third of a century. Nor has the romance of the extension of uses reached its height. For the most part past applications have centered in fields where rugged utility requirements reigned supreme. Later years, however, have brought about a distinct trend in the direction of aesthetic refinement, but the practicable harnessing of rubber by art itself is a matter of years so recent as to be correctly characterized "the present time."

Latex Paves the Way

The latex compounding and processing development efforts of Mitchell Carter, innate inventor, organizer, and vice president of the Rubber Displays, Inc., Trenton, N. J., have resulted in ways and means of producing a variety of unique articles never commercially possible with the usual rubber methods. This work serves as a reminder as well as an example of the materialization of the statement of E. A. Hauser, well-known rubber scientist, to the effect that as familiarity with latex and methods of handling it increase, new fields of rubber application will be opened that have heretofore been

closed because of the commercial and practical limitations of gum rubber manipulation.

Rubber Displays, Inc.

The name Rubber Displays, Inc., is pointedly descriptive of the type of articles this company was founded to produce and distribute. Production has ranged from advertising novelties such as the prehistoric monsters featured by the Sinclair Oil Co., plaques, devices, and characters that are the recognized insignia of breweries, distilleries, and various other business establishments; through an interesting collection of toy animals and dolls to a great variety of artistically designed mannequins, figurines, lifelike millinery heads, and forms for the effective display of wearing apparel and other types of delicate merchandise.

With creative stylistic and sculptural art this novel manufacturing process begins, and with the decorative art of life coloring it is completed. The intervening operations consist of latex deposition manipulations; while the fabricating department itself reminds one less of the conventional rubber plant than it does of a medical dissecting laboratory at work with its gruesome atmosphere caused by the presence of arms, legs, heads, and torsos at every turn.

Typical Advertising Plaque

Creative Ability

Even though Mr. Carter had no connection with rubber practice until 1926, his accomplishments since then have been singularly outstanding. Prior to beginning his experiments with latex his inventive ability produced commercially important oil burners, gas furnaces, a garbage grinder, a golfmeter, a device for seaming rubber, swimming tubes, beach balls, etc.

With a determination to utilize the mobile characteristic of latex to produce intricately shaped articles not practicable with gum rubber, he began a study of the compounding and filtration requirements of that unruly material as well as the patent coverage. After seemingly endless months of unremitting effort in trying, as he says, "everything from the plaster on the walls to chips off of the kitchen sink," the occasionally occurring positive results were totaled to reveal entirely new processes and formulae for producing stable and curable latex compounds, ranging from those of pure gum properties to those loaded with four parts of filler to one part of rubber, and others for making close texture non-clogging porous molds.

Moulage Being Made for the Exacting Reproduction in Latex of This Man's Facial Features

Manufacturing Procedure

The characteristic simplicity of latex article fabrication prevails in the production operations. The first requisite, of course, is a properly made mold. Work for this is done with special materials over models, to be discussed later, in approximately the manner of making a plaster of Paris form, care being necessary to effect perfect registration of mold joints to insure a uniform seamless deposition, and properly located apertures for the introduction and removal of the fluid rubber compound.

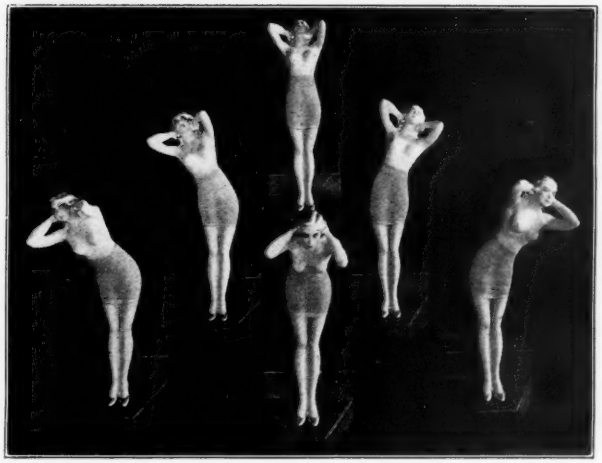
Latex of suitable composition is then introduced to keep the cavity of the assembled mold completely filled during the predetermined time and the specific conditions required to obtain a perfect surface and the desired wall thickness. The remaining latex is then withdrawn, and the mold with uniformly deposited rubber lining is subjected, as a unit, to an undisclosed, but simple dehydrating operation. Vulcanization is next accomplished by exposing the assembly to heat employing the step-up cure principle. Dry heat or open steam, depending on the type of compound and the character and size of the article, is used beginning at a temperature of 212° F. and proceeding as in the usual rubber practice.

Miniature Reproductions of Prehistoric Monsters: Tricerotops, Tyrantasaurus Rex, Brontosaurus, Tyrantasaurus, and Duck Bill Tracdon

Lightweight, Thin-Walled Animals, Whose Purposes include Toys, Advertising Specialties, and Collapsible Duck Decoys

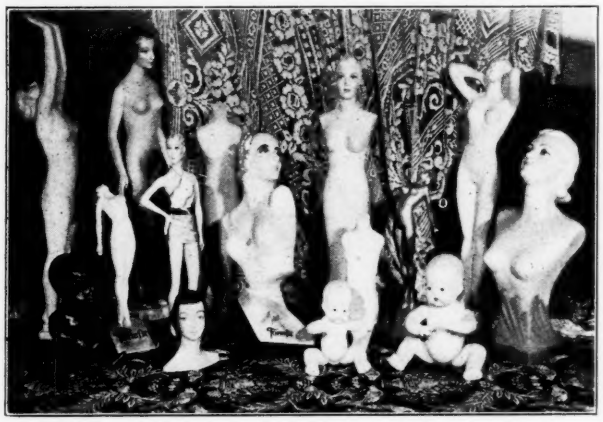
Finishing

Upon removal from the mold, joint marks and aperture flashes are carefully removed by light buffing. The articles are placed on a circular revolving table where they are decorated with especially developed gum and latex base elastic lacquers. The artist employs the usual means of application: namely, spraying for the larger background surfaces, the air brush for tinting and blending shades, and pencil brushing for particular feature effects.



A Mechanical Window Display in Which the Flexibility of Latex Figurines Is Utilized to Produce Graceful Synchronized Movement

The matter of developing lacquers applicable effectively to this type of product constituted one of the many vexatious problems of this business as will be readily appreciated when considering the following combined requirements. Each lacquer must possess the properties, inseparable adhesion, elasticity, extreme toughness, vividness and permanency of color, non-bleeding, positive and uniform dullness or gloss, inertness to ordinary cleansing agents, and ease of application by each of the various means employed.



A Variety of Indestructible Dolls and Display Creations

Margit Nilsen Creations

One important feature of this process as contrasted with the well-known molded rubber practice is the relative ease and speed with which molds can be prepared to reproduce in rubber almost any conceivable object in its most exacting details. Models may be the article to be reproduced or one sculptured from clay.

Among the latter the mannequin and figurine creations of Margit Nilsen, noted New York sculptress, artist, and stylist, are distinctively alluring. The miniatures fashioned and styled by Miss Nilsen for photographic reproduction on magazine covers and advertising matter are quite all right sculptured of soap, the material through which her unique ability found accepted expression. For those, however, that require reproduction in numbers for display at widely scheduled points, as is true with Jean and Jill, the Phoenix Hosiery twins, and others, the casualties of shipping and handling proved too great. So it was that Miss Nilsen sought a

These Chic Mannequin Creations by Margit Nilsen Are So Artistically Designed That a Mere Change of the Modernistic Sponge Latex Wig Determines Whether the Character Is to Be Girl or Boy

Representative of the Effective Design Possibilities of Latex Millinery Heads, Hosiery and Other Delicate Merchandise Display Forms—The Hosiery Hand in the Upper Background at the Left Is Designed with Internal Illumination

sturdier material for such uses, and since this need and Mr. Carter's experiments were coincidentally timed and connected, rubber became the servant of art and carried with it the requirements of beauty, perfection of detail, and flexibility as well as an underlying destruction-defying ruggedness not possessed by materials heretofore common to such pursuits. This artist is now considering the creation of mannequins with natural movement and gestures, also figures of normal size.

Other Novel Uses

The wide range of compound properties, the delicate effects that can be obtained, the simplicity of mechanical manufacturing procedure as well as the tough, durable, flexible, thin walled lightweight features of the finished product together make possible many novel applications of special interest. Some of these follow.

Indestructible duck decoys of lifelike buoyancy and quickness, unaffected by gunshot, can be collapsed and rolled into so little space that dozens can be tucked away in a hunting coat.

Wear resisting fingers for artificial hands, natural appearing even to the finger prints and skin pores and movable by hidden mechanical tendons attached to the remaining living tissues, are an unusual adaptation of rubber, made by a prominent surgeon.

Exact replicas of a person's face and head can be done in rubber by means of a moulage (a harmless plastic of quick hardening property) of special composition for this particular kind of mold casting. Great significance is being attached to very recent developments which permit simulating the shape, feel, density, plasticity, elasticity, and apparent specific gravity of any organ of the body. Medical interests are sponsoring the rubber reproduction of the bodies of living models in which the synthetic organs will be properly located, thus providing a vast improvement in the instruments of anatomical study.

This process, according to the inventor, is advantageously applicable to numerous standard items of the rubber industry such as shoes, molded goods, inner tubes, balloons, etc., but actual production facilities of the company prior to and since its incorporation, November, 1934, as Rubber Displays, Inc., have been addressed especially to the novel and more unusual lines.

Brake Linings and Clutch Facings

BRAKE linings and clutch facings consist basically of asbestos, the heat resistant element, either in woven or fibrous form or as yarn, bonded with a frictioning compound and formed into the desired shape by heat and pressure. The bonding agent, which has by far the most general use, is rubber as a milled compound or cement. Other bonds may consist of drying oil such as china wood and linseed, bituminous bodies such as asphalts, coal tars and pitches, and natural or synthetic resins.

In woven types of linings brass wire is usually woven in with the asbestos yarn to give additional strength. For certain heavy duty linings lead and zinc wires are incorporated with the brass.

Asbestos cloth is frictioned with the bonding compound, folded in plies of the desired width, and compressed under great pressure to produce folded and compressed lining. This is a very widely used lining of great efficiency.

Early in 1934 research engineers developed a new heavy-duty type of lining called woven and compressed to eliminate plied construction. Through a patented process solid fabric is woven to the required thickness, the bonding compound being introduced during this process. After the finished surfaces have been impregnated with additional bonding compound, this is compressed to the required size to give the same surface and frictional characteristics of the folded and compressed type. With this new type of lining all plies are eliminated; yet all of the frictional and long wearing characteristics of folded and compressed lining are retained.

Molded brake linings are made with asbestos mixed with the bonding compound. This is built up on a drum to the desired thickness and then cured under high pressure. Brake blocks are made by a slightly different method whereby the ingredients are mixed and poured into the press molds.

Molded clutch facings are made of molded brake linings and also of asbestos millboard impregnated with a resinous compound, and then heated to infusibility. Woven clutch facings are made in the latter manner except that the base is a woven asbestos fabric. Compound-fabric types of clutch facings include folded and compressed, and woven and compressed. These are manufactured in much the same manner as the same types of brake linings.

Methods of manufacture are of great importance, but the real governing factor of frictional characteristics of any material is the bonding compound used. Through the knowledge now acquired low- or high-friction qualities of brake linings can be accurately controlled, and with the progress of modern motor transportation and industrial equipment design this has become increasingly important. Various types of brakes now in use require special types of linings—some even calling for linings of different frictional qualities in the same brake mechanism. *The Power Specialist.*

Chewing Gum for Canton

American chewing gum can be further popularized in Canton, China, according to information received by the Department of Commerce from the American consulate in that city. The people of Canton, it is pointed out, generally are more open to Western innovations than those of most other Chinese cities.

While it is doubtful that the older and more conservative Chinese will acquire a taste for chewing gum, it is believed that the younger generation would form a nucleus for the development of a market for this product. Almost all the chewing gum sold in the city is of American make, although a few brands are produced by Chinese companies.

To stimulate sales, the consulate suggests having samples distributed during the intermissions in the programs of local motion picture houses. Imports of confectionery into the port of Canton in the past two years approximated $18,000.

New Uses of Rubber

Roy C. Peterson[1]

WHEN we think of Brazil, we are always reminded of its large coffee plantations. Not so well known is the fact that this South American country played an equally important part in early rubber development. In its tropical forests along the mighty Amazon River the natives first discovered wild rubber trees. These natives made rubber shoes to protect their feet and garments to clothe their body.

Because rubber in its original state is like bread dough —soft and ductile—its uses were very limited until the discovery of vulcanization in 1839. By heating a mixture of rubber and sulphur a product not affected by hot or cold temperatures and having good elastic qualities was obtained.

Thomas Carlysle once remarked, "that excluding the alphabet, the greatest inventions are those that bridge space." In this category we can place the automobile, the railroad, the airplane, steamship, and others. Likewise the greatest developments of rubber have followed this same trend. Tires and inner tubes are the most common of these, but there are others equally as useful but not so well known. Rubber in service is always subject to one or more of the three types of strains. They are tensile, compressive, and shear strains. As an example of rubber in tensile, we have the inner tube; of compression, the solid tire; and of shear, the vibration dampener.

Tires in Transportation

Our fast transcontinental bus lines maintaining speeds as high as 60 m.p.h. operate busses equipped with high-speed tires specially constructed to dissipate heat as rapidly as possible. Water boils at 212° F. Tires on these busses must and do perform continually at 225° to 230° F.

Considerable interest has been aroused during the past two years in cushioned wheels of various types for use on railroad equipment. This interest was probably heightened by the demonstration in this country of the "Michelene," a French rail coach mounted on pneumatic tires. The purpose of adopting a cushioned wheel is based on the idea that the railroads can, with this equipment, win back the passenger traffic they have relinquished to the busses. There are three distinct developments in cushioned wheels: first, the rubber cushioned wheel; second, the solid rubber tire; third, the pneumatic tire.

The rubber cushioned wheel has a steel rim that rolls on the rail and, while it is not so silent in operation as the others, it has the advantage of much greater load carrying capacity. Two or four rubber rings are assembled into the wheel under compression between roughened plates, and the load is carried by these rubber rings.

The solid tire is used on light inspection cars traveling at high speeds, but at loads not over 1,000 pounds per tire.

The pneumatic tire is satisfactory for loads not over 1,800 pounds per tire, but this is so much less than the load carried by the wheels of a conventional Pullman that coaches using these tires must be of light construction.

When we think of caterpillar tracks, we think of a large cumbersome piece of machinery traveling noisily along on steel plated tracks. That is we did think so until Goodrich engineers developed the "Tractor-Track." This tractor-track is a continuous rubber belt blocked off in a tread design, reenforced with steel cables longitudinally, and possessing a high flexibility and positive drive. This rubber track uses 50% less power than any other track which permits the use of a smaller more compact motor. A tractor-truck so equipped can travel along a highway at 50 m.p.h. and looks for all appearances like a sled coasting down the road. An interesting feature of the track is that it does not move on the ground, the bottom of the track being stationary and the top going 100 m.p.h. to keep up. There are no joints to wear out, and after considerable testing by the United States Government at its Aberdeen Proving Grounds these "Tractor-Tracks" have been approved and orders placed for their installation on army tractor-trucks.

Rubber Aids in Aeronautics

The ever-increasing popularity of air travel has been brought about largely through the elimination of accident hazards. One of the greatest of these is the danger of an ice formation on the leading edges of the plane. This ice forming condition arises from the presence in the atmosphere of super-cooled droplets of water in the form of fog which has been cooled below the freezing point. These droplets are prevented from crystallizing into ice by their own surface tension. As soon as the airplane hits these droplets, their surface tension is broken, and the water solidifies to form ice, which adheres to the leading edges of the plane. Tests have shown that with the ice forming on these leading edges the air dynamics may be so changed that it is extremely difficult to maneuver the ship. The most practical device for the removal of ice has proved to be a rubber de-icer, developed by Goodrich engineers, attached to the leading edge of each of the exposed parts and capable of inflation by means of compressed air. The de-icer design consists essentially of three longitudinal tubes mounted on the wing with the middle tube centered on the leading edge and the outer tubes placed one above and one below it. These tubes are inflated with compressed air, the center tube being inflated by itself, and alternately with the outer tubes which are inflated together. In this way a sort of rocking action is obtained which tends to crack the ice and lift it in such a way that the wind gets under it and sweeps it off.

When traveling through the air at speeds of 180 to 200 m.p.h., it is impossible for the paint, wood, fabric, or even metal parts of the plane to resist, for any length of time, the abrasive forces of rain or hail in the air. Rubber absorbs the force of these blows and as a result is not destroyed. Rubber abrasion shoes have been placed over these exposed surfaces and are entirely satisfactory.

For private and commercial flying these improvements have been of much assistance. For our pioneering avia-

[1] Development engineer, tire division, B. F. Goodrich Co., Akron, O.

tors such developments are but the beginning. The late Wiley Post completed a trip around the world in record time. Last summer he came to our company and asked us to make him a suit which would enable him to fly into the higher altitudes of 40,000 to 50,000 feet. His high altitude flights are now history.

Conditions at high altitudes are radically different from those here on earth. Atmospheric pressure drops from 15 pounds at sea level to 2 pounds at 40,000 feet. A person exposed to this reduced pressure will become violently ill as the heart and other internal organs will expand, causing difficult breathing. An internal pressure of 5 pounds is maintained within this suit and that added to the 2 pounds present produces the same effect as flying at an altitude of 20,000 feet, which is not injurious. The temperature is 30° to 40° F. below zero at 40,000 feet. Post found that the wind reaches a speed of 120 m.p.h. at these higher altitudes.

The stratosphere suit Wiley Post used is made similar to a diving suit and consists of three parts, an inner and outer suit and an aluminum helmet. The inner suit is an all rubber air-containing unit made by the Anode process, with the outer suit made of strong fabric and serving much the same service as a tire over an inner tube. These two suits come up to the shoulders similar to a diving suit, and the aluminum helmet is fastened to the edges of this opening. This helmet has a round window and a valve through which oxygen is circulated. Wiley Post's plane, the "Winnie Mae," has a top speed in regular flying of approximately 185 m.p.h. However by flying at 35,000 feet, at a lower atmospheric pressure, the propeller blades can be adjusted to suck in more air because of the decreased resistance, and Post thought he would be able to span the country in 7 hours, at an average speed of 350 to 400 m.p.h. In his first attempt he was forced down with motor trouble after traveling only a little more than 100 miles, but he attained a speed of around 220 m.p.h. In his second attempt he reached speeds of over 350 m.p.h., but was forced down at Cleveland.

Sponge Rubber Use Growing

Sponge rubber is gradually being adapted to more and more uses. First it was introduced in rubber balls for children. Later excellent bath sponges, chair cushions, window channel guides, etc., were developed. Now we find it in a dozen different places in automobile interiors, such as arm rests, straps, seat cushions, and others. One of the latest developments is the use of sponge rubber fillers in place of inner tubes in heavy duty tires of army trucks. A tire so assembled deflects the same as an inner tube and is, of course, absolutely puncture proof. Exhaustive tests in which the tire has been shot through with machine gun bullets were very satisfactory. On the basis of these tests army trucks are now being equipped with sponge rubber fillers in place of inner tubes.

How often have you driven along the paved highway, only to be jarred out of your seat as you pass over a raised joint in the pavement? Do you know what causes a joint to bulge? When the highway is first put in, the concrete is laid in sections of 80 to 120 feet which are separated from each other. They are separated to permit these sections to expand and contract with varying changes in temperature. This space between is filled with asphalt which is satisfactory until the concrete becomes hot and expands, squeezing out the asphalt, which is forced up above the cement and worn off by passing automobiles. Then when the concrete cools down, the space between sections becomes filled with water and dirt. The next time the concrete expands this space is closed and the pavement bulges. Under extreme pressure this bulge cracks open, and the highway maintenance department has a job on its hands. An ideal expansion joint should be capable of both expansion and contraction. The opening between sections should be filled at all times. The joint must not extrude above the surface of the pavement when the slab expands. Goodrich has such an expansion joint. It is made of sponge rubber, and artificial aging tests have shown that it will retain its life for 15 to 20 years. Joints laid in the concrete on State Route No. 18, just west of Youngstown, O., have been in service for 3½ years and are very satisfactory.

Utility of Rubber to Metal Adhesion

During the last five or six years a new field for rubber development has been opened: that of adhesion of rubber to metal. This was possible through the use of Vulcalock, a Goodrich product made of rubber, which is a very satisfactory bond between rubber and metal. Rubber lined tank cars have revolutionized the chemical industry. Where previously acids were shipped in small glass containers, they are now delivered by the tank car full. Rubber motor supports are used by practically all automobile manufacturers. Tests on these supports show the adhesion to be strong enough to hold even though the steel shell is bent.

Some of the latest developments are rubber covered pipes, vibration dampeners, rubber bushings, and rubber springs. Rubber covering for pipes is used for covering pipe lines to be buried in the ground. Some gas companies plan on digging up present pipe lines to cover these pipes. Deterioration of the metal is a serious problem, and the rubber covering will age very well in the ground, preventing this. A rubber spring consists of two cylindrical steel rings with a ring of rubber in between cemented to both steel rings. The inside ring is higher than the bottom, and, when the load is applied, the rubber is in shear. This rubber is of sufficient strength to allow a given deflection or downward movement over a period of years with no appreciable fatigue. Rubber springs constitute a spring and shock absorber combination because of their dampening effect. At present these springs are used on street car trucks to support the car's weight.

New Upholstering Developments

Of all recent rubber developments the most unique is the new product called NuKraft. This is rubber insulated hair cloth fabricated into loops forming a series of figure-eight springs. It is used as spring deckings for inner spring mattresses. The rubber ages well, not showing any appreciable deterioration when artificially aged for a period representing around ten years of actual service. This product is vermin-proof, sanitary, and free from objectionable odors. NuKraft bridges the openings between springs and evenly distributes the weight. It not only provides additional springing, but eliminates the necessity of tufting to keep the material in position. NuKraft is also used as spring decking for automobile cushions and upholstering. NuKraft is to an innerspring mattress what pneumatic tires are to automobile springs.

Growth of Rubber Consumption

Here are some figures on rubber production through the years. Before the discovery of vulcanization the annual rubber output was about 10,000 tons a year. During the next twenty years this production was trebled. Around 1912 the use of automobile tires and tubes jumped rubber production to 100,000 tons. In the peak year of 1929, 863,410 tons of rubber were used. Since then rubber has made great strides and in 1934, even

(*Continued on page* 45)

Compounding Ingredients[1]

Compositions—Properties—Functions

THE following is a collection of miscellaneous ingredients. With the exception of the vulcanizing agents, sulphur and sulphur chloride, the list comprises ingredients commonly employed in general rubber practice. They serve variously as inert fillers, gravity reducers, surface finishes, and processing aids. Those of neutral character are available also for control of volume cost.

Asbestos

CHEMICAL COMPOSITION. Fibrous silicates of magnesium, calcium, and aluminum.
SELLER. Wishnick-Tumpeer, Inc.
APPLICATIONS. Packing, brake blocks.
PHYSICAL STATE. Fluffy short fibers.
PROPERTIES. Sp. gr., 2.85. Stable. Odorless. Non-toxic. Insoluble. Infusible.
PURPOSE AND FUNCTION. Heat resistant.
METHODS OF USE. Add directly to the rubber.
VULCANIZATION. No effect on cure.
PATENTS. Not disclosed.

Barytes

CHEMICAL COMPOSITION. Barium sulphate. 99.9% with traces of silica and oxides of aluminum and iron.
SELLER. Wishnick-Tumpeer, Inc., and C. K. Williams & Co.
APPLICATIONS. Inner tubes, footwear, mechanicals, belting, packing, hose, molded articles, heels, soles, druggists' sundries, imitation leather, etc.
PHYSICAL STATE. The powdered white mineral, water ground and floated.
PROPERTIES. Sp. gr., 4.45. Insoluble. Stable. Odorless. Non-toxic.
PURPOSE AND FUNCTION. Inert filler, increases specific gravity of mixings, reduces permanent set, increases resistance to tearing.
METHODS OF USE. Add directly to the rubber.
VULCANIZATION. No effect on cure.
PATENTS. None.

Calcene

CHEMICAL COMPOSITION. Calcium carbonate (97 to 98%) treated with 2% coating agent.
SELLER. Columbia Alkali Corp.
APPLICATIONS. Tire carcasses, inner tubes, footwear, mechanicals, molded articles, heels, soles, insulation and extruded products, druggists' sundries, etc.
PHYSICAL STATE. White powder of which 98% is less than 0.5-micron in particle size.
PROPERTIES. Sp. gr., about 2.70. Stable. Non-toxic.
PURPOSE AND FUNCTION. Tensile reenforcement, improved resistance to tearing and abrasion, and good processing.
METHODS OF USE. Add directly to the rubber.
VULCANIZATION. Very slight activation with some accelerators.
PATENTS. Not disclosed.

Catalpo

CHEMICAL COMPOSITION. Hydrous aluminum silicate treated chemically for reducing its particle size and shape.
SELLER. Moore & Munger.
APPLICATIONS. Tire treads, carcasses, inner tubes, footwear, mechanicals, molded articles, heels, soles, insulation and extruded products, druggists' sundries.
PHYSICAL STATE. White powder free of grit. Uniform particle size, 99.8% passes through 325-mesh screen.
PROPERTIES. Sp. gr., 2.55. Stable. Non-toxic.
PURPOSE AND FUNCTION. Inert filler, resilience, tensile reenforcement, finish.
METHODS OF USE. Add directly to the rubber.
VULCANIZATION. Very slight, if any effect on cure.
PATENTS. Not disclosed.

Columbia Filler

CHEMICAL COMPOSITION. Calcium carbonate 98 to 99%.
SELLER. Columbia Alkali Corp.
APPLICATIONS. Beads, inner tubes, footwear, mechanicals, molded articles, heels, soles, extruded products, druggists' sundries.
PHYSICAL STATE. Slightly cream tinged powder 99% through 300 mesh.
PROPERTIES. Sp. gr., 2.70. Stable. Odorless. Non-toxic. Decomposed by acids. Slightly alkaline reaction.
PURPOSE AND FUNCTION. Inert filler. Smooth finish.
METHODS OF USE. Add directly to the rubber.
VULCANIZATION. No effect on cure.
PATENTS. Not disclosed.

Cumar EX

CHEMICAL COMPOSITION. A synthetic resin; mixture of polymers of coumarone, indene, and homologous compounds.
SELLER. The Barrett Co.
APPLICATIONS. Insulated wire and cable, tires, adhesive tape, hard rubber goods, and delicately colored sheets.
PHYSICAL STATE. Odorless brown solid.
PROPERTIES. Sp. gr., 1.05 to 1.15 according to grade. Melting ranges, 100 to 115° C. (212 to 239° F.). Disperses readily in rubber. Soluble in practically all common solvents with exception of methyl and ethyl alcohols, butanol, and glycerine. Stable. Odorless. Cumar may be blended with limited proportions with a wide variety of bituminous materials, waxes, and mineral oils by heating slightly above its melting point. It is compatible with nearly all vegetable oils, but not with oleic acid. Cumar is neutral, waterproof, and resists acids and alkalies. Is an excellent insulation with high dielectric constant. Appreciably retards bleeding of organic colors.
PURPOSE AND FUNCTION. Maintains tensile properties, gives good abrasion and aging properties. Increases Shore hardness and is especially adapted for tap compounds and other stocks where hardness is desired. In reclaiming rubber, the cumars impart softness and prevent the reclaims from drying-out, and facilitate smooth spreading of cements. They contribute antiscorching properties.
METHODS OF USE. Add directly to the rubber.
VULCANIZATION. Retards rate of cure.
PATENTS. Not disclosed. Trade mark registered.

Diatomaceous Earth

CHEMICAL COMPOSITION. Silica. The fossil remains of infusoria or diatomes.
SELLER. Wishnick-Tumpeer, Inc.
APPLICATIONS. Mechanicals, belting, packing, hose, heels, soles, insulation and extruded products, druggists' sundries, etc.
PHYSICAL STATE. Fine white powder.
PROPERTIES. Sp. gr., 2.62. Insoluble. Stable. Odorless. Non-toxic. Inert chemically. Finely abrasive. Heat resistant.
PURPOSE AND FUNCTION. Inert filler, hardness, heat resistant.
METHODS OF USE. Add directly to the rubber.
VULCANIZATION. No effect on cure.
PATENTS. None.

Duphax A

CHEMICAL COMPOSITION. Vulcanized oil.
SELLER. The Stamford Rubber Supply Co.
APPLICATIONS. Compounding with DuPrene.
PHYSICAL STATE. Cake form, tan color. Soft.
PROPERTIES. Sp. gr., 1.04. Stable. Odorless. Non-toxic.

[1] Continued from INDIA RUBBER WORLD, September 1, 1935, pp. 42-44.

PURPOSE AND FUNCTION. Softener. Low gravity diluent.
METHODS OF USE. Add directly to the DuPrene.
VULCANIZATION. No effect on cure.
PATENTS. Not disclosed.

Duphax B

Same as Duphax A except of firmer consistency.

Fac-Cel B

CHEMICAL COMPOSITION. Vulcanized oils.
SELLER. The Stamford Rubber Supply Co.
APPLICATIONS. Mechanicals, molded articles, druggists' sundries.
PHYSICAL STATE. White fluffy powder.
PROPERTIES. Sp. gr., 1.00. Stable. Odorless. Non-toxic.
PURPOSE AND FUNCTION. Improves finish and facilitates extruding.
METHODS OF USE. Add directly to the rubber.
VULCANIZATION. Retards curing less than ordinary white factice.
PATENTS. Not disclosed.

Fac-Cel C

Same as Fac-Cel B except in its chemical means of offsetting cure retardation.

Factice, Amberex

CHEMICAL COMPOSITION. Vulcanized oil.
SELLER. The Stamford Rubber Supply Co.
APPLICATIONS. Druggists' sundries and tubing of white and pastel shades. Sponge rubber.
PHYSICAL STATE. Amber color, powdered.
PROPERTIES. Sp. gr., 0.96. Stable. Odorless. Non-toxic.
PURPOSE AND FUNCTION. Reduces time of milling batches. Gives fine uniform pore in sponge rubber.
METHODS OF USE. Add directly to the rubber.
VULCANIZATION. Does not retard curing.
PATENTS. Not disclosed.

Factice, Black

CHEMICAL COMPOSITION. Vulcanized oil with mineral rubber added.
SELLER. The Stamford Rubber Supply Co.
APPLICATIONS. Molded articles and extruded products.
PHYSICAL STATE. Black cakes.
PROPERTIES. Stable. Odorless. Non-toxic.
PURPOSE AND FUNCTION. Facilitates extrusion and gives smooth finish on tubing.
METHODS OF USE. Add directly to the rubber.
VULCANIZATION. Does not retard curing.
PATENTS. Not disclosed.

Factice, Brown

CHEMICAL COMPOSITION. Vulcanized oil.
SELLER. The Stamford Rubber Supply Co.
APPLICATIONS. Mechanicals, molded articles, extruded products, druggists' sundries, proofing.
PHYSICAL STATE. Cake form in brown shades.
PROPERTIES. Sp. gr., 1.04. Stable. Odorless. Non-toxic.
PURPOSE AND FUNCTION. Finish. Facilitates extrusion. Contributes a velvet feel to rubber goods.
METHODS OF USE. Add directly to the rubber.
VULCANIZATION. Does not retard curing.
PATENTS. Not disclosed.

Factice, White

CHEMICAL COMPOSITION. Vulcanized oils.
SELLER. The Stamford Rubber Supply Co.
APPLICATIONS. Mechanicals, molded articles, druggists' sundries.
PHYSICAL STATE. White fluffy powder.
PROPERTIES. Sp. gr., 1.00 to 1.36. Stable. Odorless. Non-toxic.
PURPOSE AND FUNCTION. Velvet finish and facilitates extruding.
METHODS OF USE. Add directly to the rubber.
VULCANIZATION. Retards curing.
PATENTS. Not disclosed.

Flock, Cotton

CHEMICAL COMPOSITION. Cellulose.
SELLER. Claremont Waste Mfg. Co.
APPLICATIONS. Heels, soles, and surface finish for proofed goods
PHYSICAL STATE. Finely cut fluffy fiber in black, white, and colors.
PROPERTIES. Sp. gr., 1.25. Stable. Odorless. Non-toxic.
PURPOSE AND FUNCTION. Fibrous binder. As a finish gives a suede leather effect.
METHODS OF USE. In molded articles compound directly in the rubber. For suede finish dust on the face of spread goods before vulcanization.
VULCANIZATION. No effect on cure.
PATENTS. Not disclosed.

Flock, Rayon

CHEMICAL COMPOSITION. Nitro-cellulose.
SELLER. Claremont Waste Mfg. Co.
APPLICATIONS. Proofed goods.
PHYSICAL STATE. Finely cut fluffy fiber in white and colors.
PROPERTIES. Sp. gr., 1.25. Stable. Odorless. Non-toxic.
PURPOSE AND FUNCTION. Silk-like surface on proofed goods.
METHODS OF USE. Dust on to the unvulcanized surface of spread goods before vulcanization.
VULCANIZATION. No effect on cure.
PATENTS. Not disclosed.

Fossil Flour

Same as Diatomaceous Earth, *which see.*

Graphite, Flake

CHEMICAL COMPOSITION. Graphitic carbon.
SELLER. Joseph Dixon Crucible Co.
APPLICATIONS. Packing, molded articles.
PHYSICAL STATE. Flaky powder from 2½ microns to very large flakes. The finer sizes are grayish black, becoming a bright silvery sheen in the larger flakes.
PROPERTIES. Sp. gr., 2.40. Stable. Odorless. Insoluble. Non-toxic. Slippery feel.
PURPOSE AND FUNCTION. Lubrication for packings. Inert filling for color and bright polished finish.
METHODS OF USE. Surface application or add directly to the rubber.
VULCANIZATION. No effect on cure.
PATENTS. None.

Hakuenka

CHEMICAL COMPOSITION. Isomer of calcium carbonate in which the colloidal calcium carbonate is 42.21%.
SELLER. Shiraishi Kogyo Kaisha, Ltd., Tokyo, Japan.
APPLICATIONS. General rubber compounding.
PHYSICAL STATE. Glossy white powder specially processed. Its particle size is mostly from 0.5- to 0.3-micron and none above 2 microns.
PROPERTIES. Sp. gr., about 2.00. Stable. Non-toxic.
PURPOSE AND FUNCTION. Remarkable dispersive ability, high tensile properties, acid resisting power. Improves the wetting power of other compounding powders.
METHODS OF USE. Add directly to the rubber.
VULCANIZATION. Effect slight, if any.
PATENTS. Not disclosed.

Infusorial Earth

Same as Diatomaceous Earth, *which see.*

Kalite No. 1

CHEMICAL COMPOSITION. Coated calcium carbonate. Contains 1% stearic acid.
SELLER. R. T. Vanderbilt Co.
APPLICATIONS. Tire carcasses, inner tubes, footwear, mechanicals, molded articles, insulation and extruded products, druggists' sundries.
PHYSICAL STATE. White powder.
PROPERTIES. Sp. gr., 2.66. Stable. Non-toxic. Repellent to water.
PURPOSE AND FUNCTION. Gives high tensile and elongation with low stiffening effect, good tear and flex resistance. Improves processing and extrusion.
METHODS OF USE. Added as filler in high or low loadings directly to the rubber.
VULCANIZATION. Activates the cure.
PATENTS. Not disclosed.

Kalite No. 3

Same as Kalite No. 1 except that it contains 3% stearic acid and has sp. gr. of 2.56

Lime Crest Filler No. 100 (formerly "Sussex Whiting")

CHEMICAL COMPOSITION. Calcium carbonate. (Pulverized limestone.)
SELLER. Limestone Products Corp. of America.
APPLICATIONS. General mechanical and insulated wire stocks.
PHYSICAL STATE. Off-color air-floated white powder. 99.5% through 200 mesh.
PROPERTIES. Sp. gr., 2.70. Stable. Odorless. Non-toxic. Decomposed by acids.
PURPOSE AND FUNCTION. Inert filler.
METHODS OF USE. Add directly to the rubber.
VULCANIZATION. No effect on cure.
PATENTS. Not disclosed.

Lime, Hydrated

CHEMICAL COMPOSITION. Calcium oxide.
SELLER. Wishnick-Tumpeer, Inc.
APPLICATIONS. Mechanicals, molded articles, extruded products, hard rubber.
PHYSICAL STATE. White powder.
PROPERTIES. Sp. gr., 2.08. Stable. Odorless. Absorbs moisture.
PURPOSE AND FUNCTION. Accelerator of vulcanization. Prevents porosity in cured rubber.
METHODS OF USE. Add directly to the rubber.
VULCANIZATION. Hastens curing.
PATENTS. None.

Litharge, Commercial

CHEMICAL COMPOSITION. Lead monoxide.
SELLER. Wishnick-Tumpeer, Inc.
APPLICATIONS. Mechanicals, footwear, molded articles, etc.
PHYSICAL STATE. Yellow to tan powder.
PROPERTIES. Sp. gr., 9.35. Stable. Odorless. Toxic. Soluble in acids.
PURPOSE AND FUNCTION. Accelerator of vulcanization. Gravity.
METHODS OF USE. Add directly to the rubber.
VULCANIZATION. Hastens curing.
PATENTS. Not disclosed.

Magnesia, Heavy Calcined

CHEMICAL COMPOSITION. Magnesium oxide.
SELLER. Wishnick-Tumpeer, Inc.
APPLICATIONS. Mechanicals, molded articles, extruded products, hard rubber.
PHYSICAL STATE. White powder.
PROPERTIES. Sp. gr., 3.20. Stable. Odorless. Non-toxic.
PURPOSE AND FUNCTION. Accelerator of vulcanization particularly for resinous soft grades of rubber. Also accelerator for hard rubber.
METHODS OF USE. Add directly to the rubber.
VULCANIZATION. Hastens curing.
PATENTS. None.

Mica

CHEMICAL COMPOSITION. Potassium aluminum silicate.
SELLER. American Cyanamid & Chemical Corp.
APPLICATIONS. Packing, molded articles, dusting.
PHYSICAL STATE. Powdered to pass 60, 80, 120, and 300 mesh.
PROPERTIES. Sp. gr., 3.00. Stable. Odorless. Non-toxic. Lubricating. Withstands heat, etc.
PURPOSE AND FUNCTION. Heat resistant in steam packings and brilliant dust surface finish on sheet goods.
METHODS OF USE. Surface application, or mix directly with the rubber.
VULCANIZATION. No effect on cure.
PATENTS. Not disclosed.

Plumbago

CHEMICAL COMPOSITION. Graphitic carbon either amorphous or crystalline.
SELLER. Joseph Dixon Crucible Co.
APPLICATIONS. Tire beads, inner tubes, belting, packing, hose, molded articles.
PHYSICAL STATE. Powder. The amorphous grades are black and distinctive from the flake or crystalline varieties.
PROPERTIES. Sp. gr., 2.40. Stable. Odorless. Insoluble. Non-toxic. The crystalline grades are purer than the amorphous, more lubricative, and generally higher grade.
PURPOSE AND FUNCTION. Lubrication for packings, inert filling for color and finish of surface.
METHODS OF USE. Surface application, or add directly to the rubber.
VULCANIZATION. No effect on cure.
PATENTS. Not disclosed.

Pumice

CHEMICAL COMPOSITION. Porous volcanic rock composed of silicate of alumina with trace of alkaline earth.
SELLER. Whittaker, Clark & Daniels, Inc.
APPLICATIONS. Erasers.
PHYSICAL STATE. Gritty white powder.
PROPERTIES. Sp. gr., 2.3 to 2.4. Stable. Odorless. Non-toxic.
PURPOSE AND FUNCTION. Abrasive component.
METHODS OF USE. Add directly to the rubber.
VULCANIZATION. No effect on cure.
PATENTS. None.

Pyrax

CHEMICAL COMPOSITION. Not disclosed.
SELLER. R. T. Vanderbilt Co.
APPLICATIONS. Primarily for rubber dusting purposes, also tiling, toys, battery boxes.
PHYSICAL STATE. Brilliant white powder 99.9% through 100 mesh.
PROPERTIES. Sp. gr., 2.60. Stable. Odorless. Non-toxic. Withstands mineral acids.
PURPOSE AND FUNCTION. Pyrax dusted surfaces of unvulcanized rubber stocks will not adhere. Pyrax compounded stocks are hard and acid resistant.
METHODS OF USE. Applied as surface dusting and added directly to the rubber.
VULCANIZATION. No effect on cure.
PATENTS. Not disclosed.

Resin "C"

CHEMICAL COMPOSITION. Resinous distillate of coal tar pitch.
SELLER. The Barrett Co.
APPLICATIONS. Hard rubber compositions.
PHYSICAL STATE. Solid resin.
PROPERTIES. Sp. gr., 1.20 to 1.28. M. p., 87.22 to 92.78° C. (125 to 135° F.). Stable. Odorless. Non-toxic. Mild antioxidant. Imparts a heavy bloom and is only recommended where this is not important.
PURPOSE AND FUNCTION. Fluxes readily with rubber. Gives maximum plasticity and softening.
METHODS OF USE. Add directly to the rubber.
VULCANIZATION. No effect on cure.
PATENTS. None.

Rottenstone

CHEMICAL COMPOSITION. Principally silica, 10 to 15% alumina and trace of lime.
SELLER. Whittaker, Clark & Daniels, Inc.
APPLICATIONS. Polish for hard rubber articles.
PHYSICAL STATE. Ash-brown powder of 300 mesh.
PROPERTIES. Sp. gr., about 2.5. Stable. Odorless. Non-toxic.
PURPOSE AND FUNCTION. Polishing hard rubber.
METHODS OF USE. Applied with oil after vulcanization.
PATENTS. None.

Rubber Substitute, Brown

CHEMICAL COMPOSITION. Sulphurized vegetable oils.
SELLER. Carter Bell Mfg. Co.
APPLICATIONS. Footwear, mechanicals, molded articles, extruded products, proofed fabrics, sponge rubber.
PHYSICAL STATE. Solid cake and granular.
PROPERTIES. Sp. gr., 1.04. Stable. Odorless. Non-toxic.
PURPOSE AND FUNCTION. Softener. Facilitates spreading and extrusion.
METHODS OF USE. Add directly to the rubber.
VULCANIZATION. Does not retard curing.
PATENTS. Not disclosed.

Rubber Substitute, White

CHEMICAL COMPOSITION. Sulphurized castor and corn oils, rapeseed oil, and soya bean oil.
SELLER. Carter Bell Mfg. Co.
APPLICATIONS. Footwear, mechanicals, extruded products, pencil erasers, proofed fabrics, and sponge rubber products.
PHYSICAL STATE. Spongy cake, ground or sticky plastic.
PROPERTIES. Sp. gr., 1.04. Stable. Odorless. Non-toxic.
PURPOSE AND FUNCTION. Softener. Facilitates spreading and extrusion processes.

METHODS OF USE. Add directly to the rubber.
VULCANIZATION. Retards curing.
PATENTS. Not disclosed.

Silica

CHEMICAL COMPOSITION. Silicon oxide from powdered quartz.
SELLER. Wishnick-Tumpeer, Inc.
APPLICATIONS. Erasers.
PHYSICAL STATE. Gritty white powder.
PROPERTIES. Sp. gr., 2.65. Stable. Odorless. Non-toxic. Insoluble in all solvents. Infusible.
PURPOSE AND FUNCTION. Hardness abrasive.
METHODS OF USE. Add directly to the rubber.
VULCANIZATION. No effect on cure.
PATENTS. Not disclosed.

Sulphur, Aero Brand

CHEMICAL COMPOSITION. Refined sulphur.
SELLER. American Cyanamid & Chemical Corp.
APPLICATIONS. In stock for all vulcanized rubber products.
PHYSICAL STATE. Yellow powder of 200 and 300 mesh.
PROPERTIES. Sp. gr., 2.04. Stable. Odorless. Non-toxic. Melts at 114.5° C. (238° F.). Boiling point, 444.55° C. (832° F.), is sensibly volatile at 100° C. (212° F.), and in air burns at 261° C. (502° F.). Insoluble in water and acids, but dissolves in cold carbon disulphide and in alcohol, ether, and light petroleum when heated.
PURPOSE AND FUNCTION. Principal vulcanizing agent for rubber.
METHODS OF USE. Add directly to the rubber.
VULCANIZATION. Curing range commonly from 140 to 198° C. (284 to 325° F.) according to circumstances and conditions.
PATENTS. Not disclosed.

Sulphur Chloride

CHEMICAL COMPOSITION. Sulphur mono-chloride.
SELLER. Tyson Brothers, Inc.
APPLICATIONS. Dipped goods chiefly.
PHYSICAL STATE. Yellow acid liquid.
PROPERTIES. Sp. gr., 1.07. Liquid. Odor sulphurous. Fumes poisonous.
PURPOSE AND FUNCTION. Vulcanization of thin layers of pure rubber.
METHODS OF USE. Expose thin-proofed stock to fumes in closed hot room, or dip pure gum article in the material diluted with naphtha.
VULCANIZATION. Rapid.
PATENTS. Not disclosed.

Suprex White, Extra-Light

CHEMICAL COMPOSITION. Calcium carbonate.
SELLER. J. M. Huber, Inc.
APPLICATIONS. Footwear, molded articles, mechanical goods, inner tubes, surgical goods.
PHYSICAL STATE. White powder of soft texture and minute particle size and fluffy.
PROPERTIES. Sp. gr., 2.60. Stable. Odorless. Non-toxic. Decomposed by acids.
PURPOSE AND FUNCTION. Inert filler. Contributes elongation, resilience, tensile reenforcement, and tear resistance.
METHODS OF USE. Add directly to the rubber.
VULCANIZATION. Retards cure slightly.
PATENTS. Not disclosed.

Suprex White, Heavy

CHEMICAL COMPOSITION. Calcium carbonate.
SELLER. J. M. Huber, Inc.
APPLICATIONS. Inner tubes, mechanicals, molded articles, footwear, surgical goods.
PHYSICAL STATE. White powder of soft texture and minute particle size and dense.
PROPERTIES. Sp. gr., 2.60. Stable. Odorless. Non-toxic. Decomposed by acid.
PURPOSE AND FUNCTION. Inert filler. Contributes elongation, resilience, tensile reenforcement, and tear resistance.
METHODS OF USE. Add directly to the rubber.
VULCANIZATION. Retards cure slightly.
PATENTS. Not disclosed.

Talc

CHEMICAL COMPOSITION. Magnesium silicate.
SELLER. Binney & Smith Co.
APPLICATIONS. Primarily for rubber dusting purposes, also tiling, toys, battery boxes.
PHYSICAL STATE. Brilliant white powder 99.9% through 100 mesh.
PROPERTIES. Sp. gr., 2.60. Stable. Odorless. Non-toxic. Withstands mineral acids.
PURPOSE AND FUNCTION. Talc dusted surfaces of unvulcanized rubber stocks will not adhere, and talc compounded stocks are hard and acid resistant.
METHODS OF USE. Applied as surface dusting and added directly to the rubber.
VULCANIZATION. No effect on cure.
PATENTS. None.

Tripoli

Same as Diatomaceous Earth, *which see.*

Whiting, Southwark

CHEMICAL COMPOSITION. Calcium carbonate 98% or more, low in magnesia. Source, English chalk. Known also as Paris white and English cliffstone.
SELLER. Southwark Mfg. Co.
APPLICATIONS. Suitable for compounding in rubber stocks for all purposes where an inert filler is desired.
PHYSICAL STATE. Slightly cream white, 99.5% passes 325 mesh.
PROPERTIES. Sp. gr., 2.70. Stable. Odorless. Non-toxic. Decomposed by acids.
PURPOSE AND FUNCTION. Inert filler, smooth finish.
METHODS OF USE. Add directly to the rubber.
VULCANIZATION. No effect on cure.
PATENTS. Not disclosed.

Whiting, Witco

CHEMICAL COMPOSITION. Calcium carbonate.
SELLER. Wishnick-Tumpeer, Inc.
APPLICATIONS. Inner tubes, footwear, mechanicals, belting, packing, hose, molded articles, heels, soles, insulation and extruded products, druggists' sundries, etc.
PHYSICAL STATE. White powdered natural mineral, 300 mesh.
PROPERTIES. Sp. gr., 2.70. Stable. Odorless. Non-toxic. Slightly alkaline reaction. Decomposed by acids.
PURPOSE AND FUNCTION. Inert filler. Smooth finish.
METHODS OF USE. Add directly to the batch.
VULCANIZATION. No effect on cure.
PATENTS. Not disclosed.

Whiting, York, Domestic

CHEMICAL COMPOSITION. Calcium carbonate.
SELLER. Tyson Brothers, Inc.
APPLICATIONS. Beads, packing, hose, molded articles, insulation and extruded products.
PHYSICAL STATE. Off-color white powder, soft texture, passes through 200 mesh.
PROPERTIES. Sp. gr., 2.70. Stable. Odorless. Non-toxic. Decomposed by acids.
PURPOSE AND FUNCTION. Inert filler.
METHODS OF USE. Add directly to the rubber.
VULCANIZATION. Practically no effect on cure.
PATENTS. None.

Witco No. 20

CHEMICAL COMPOSITION. Bitumen petroleum product.
SELLER. Wishnick-Tumpeer, Inc.
APPLICATIONS. Tire treads, carcasses, mechanicals, footwear, heels, molded goods.
PHYSICAL STATE. Liquid at ordinary temperatures.
PROPERTIES. Sp. gr., 0.970 to 0.985. Stable. Odorless. Non-toxic. Soluble in rubber.
PURPOSE AND FUNCTION. Softener. Improves tensile and aging.
METHODS OF USE. Add directly to the rubber.
VULCANIZATION. No effect on cure.
PATENTS. Not disclosed.

Wood Flour, Grade 1

CHEMICAL COMPOSITION. Selected soft wood.
SELLER. G. A. Wharry & Co. and Becker, Moore & Co., Inc.
APPLICATIONS. Footwear, mechanicals, molded articles, heels, soles, extruded products, battery boxes.
PHYSICAL STATE. Maximum particle size is 60 mesh.

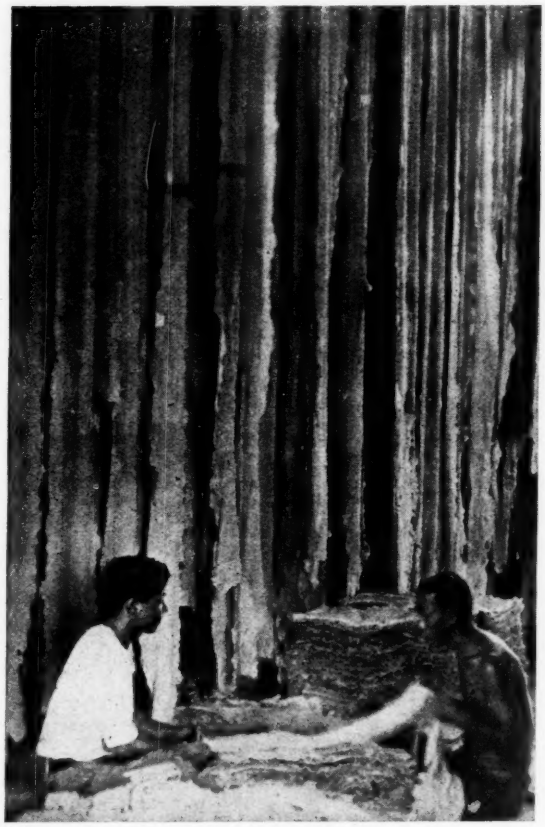
(Continued on page 41)

How International Rubber Restriction Came About[1]

Everett G. Holt

MEANWHILE the idea had seemingly persisted among British rubber producers that restriction, properly managed, would raise prices and that the Stevenson Scheme had been needlessly abandoned in 1928. Its faults of course were patent. It had stimulated competitive production and the use of substitutes and reclaimed rubber. It had led to some corruption and a considerable amount of smuggling. It had not furthered the productive efficiency of the estates. It had been inflexible and indifferent to the representations made by groups of business men. It had not furthered content among producers or amicability between nations. And yet, without question, its transcendent fault was that it had secured the adherence of none but British producing countries.

[1] Reprinted from *Asia*, June, 1935, pp. 327-31. Concluded from INDIA RUBBER WORLD, Sept. 1, 1935, pp. 39-41.



Asia

In the Drying Sheds Hang Sheets of Rubber, Measuring About One by Twenty Feet. They Have Passed through the Coagulating and Cutting Processes and Are Now Ready for "Smoking"

U. S. Rubber Products, Inc.

Bales of Rubber, Coming from the Press, Are Automatically Pushed Down Chutes. As They Tumble Out, the Coolies Waiting Outside Catch Them and Cover Them with Gunny Sacking

Accordingly, until early in 1932, the British tried to persuade the Dutch, who professed inability to control native production, to change their views and coöperate in a policy of restriction. Then, having failed, they had assumed, shortly after going off the gold standard, an attitude of unwillingness for the future to take the initiative. If there were any more negotiations, the Dutch would have to suggest them. But the Dutch did not see fit to do so until the Spring of 1933. At that time they were in need of revenue; they cherished no hope under existing conditions of substantial profits from their rubber estates; they had some experience of control of both tin and sugar; and they had taken cognizance of the benefits to be expected from coöperation with England in the East. For some such reasons, presumably, the Prime Minister and Minister for the Colonies, Dr. Colijn, early in May indicated his belief that legal restriction was desirable "if a practical and useful scheme applicable to native production and acceptable to the

British Government" could be drafted. He intimated that, if the producing companies could arrive at an agreement, the government would then take a more active part. Thereupon a committee of the Dutch International Association for Rubber Cultivation met on June 21 with representative British, French, and other producers in Middle Asian territory.

Uncertain of the outcome and fearful of disturbing the market, they carried on their conversations with the utmost secrecy. They were soon to have for their guidance, so far as they wished to use it, a convention outlined by the drafting committee of the World Economic Conference on basic conditions of any plan to balance the supply and demand for primary commodities and to raise wholesale prices. Its appearance was timely, and, though it did not pass beyond the status of a resolution, its applicability to rubber, as, for example, to wheat, was obvious. Slightly condensed, its specifications were: that any regulatory agreement should concern a commodity of such importance in international trade that an excess of production or stocks calls for concerted action; that such an agreement should not omit substitute products if its success requires their inclusion; that it should be generally supported by the exporting countries and, if it cannot otherwise be a success, should provide for the coöperation of the non-exporting countries having considerable production; that it should be fair to both producers and consumers and should as far as possible be worked out with the willing coöperation of the consuming interests in the importing countries; that it should be workable, so that the governments concerned may be expected to have the power and the will to enforce it in their respective territories; that it should be of adequate duration to achieve its objects; that it should provide for prompt and orderly expansion of supply to meet improved demand; that it should have due regard for encouragement of efficient production in each country.

On June 29, five days after this draft convention was made public, certain members of the Dutch committee proceeded to London, and thereafter for some time representatives of the various producers' organizations were constantly exchanging visits and views. The French delegates (it appears) then returned home to draft a bill of particulars on which the Dutch and the British must act before securing French adherence, and meanwhile the Government of Netherlands India sought to accustom the native producers in the Residencies to the idea of restriction by steering through the Volksraad, or People's Council—a colonial, partly native body of very nominal powers, with a chairman appointed by the Crown and a majority of appointed members—a bill providing for general regulation and restriction of exports. This bill and certain meetings at which native producers approved 50% individual restriction in theory anticipated objections that would be made, when rubber was involved, to restriction in fact. In September commissioners of outlying Residencies met in Batavia to discuss restriction, and later in the month the Netherlands Government denounced the 1929 Geneva Convention for Abolition of Import and Export Prohibitions, and thus it freed itself of any outside control of its economic policy.

Some observers then disbelieved, as some few still do disbelieve, in the possibility of solving the problem of rubber control in a manner conformable to the conditions laid down in the draft outlined at the World Economic Conference. Among these observers, it seems, was Sir Cecil Clementi, who, as Governor-General of British Malaya at the time, expressed his adherence to the principles laid down in that draft and warned the Straits Legislative Council, in an address made on October 2, 1933, not to be misled by "unfounded rumors" concerning rubber restriction. His remarks reflected doubt of all restriction schemes and betrayed something of the spirit then pervading Malaya—that the planters there, having put their own house in order, were in a position to meet and overcome Dutch competition. Sir Cecil might also have meant to influence his home government against a policy that he thought to be unwise or to force the Dutch into complying with British demands. Or possibly he was not fully informed on the status of negotiations by October 2, but in any case, as later became evident, he remained unconvinced of the soundness of the agreement as finally arrived at.

The original plan was evidently to provide in the agreement for introducing restriction at the beginning of 1934, but the plan was not carried out. The British and Dutch delegates at a London meeting late in 1933 appear to have accepted the French delegates' bill of particulars, granting them very generous concessions in exchange for nominal restriction and active coöperation in prevention of smuggling. Then, whether it was that the Dutch could not at once satisfy the British of the practicability of their plans for controlling Netherlands Indian native production or that the representatives of Sarawak and Siam needed time for correspondence with their respective governments, there ensued a long delay. This gave rise to further fears or hopes (in accordance with the observer's point of view) that the problem of controlling native production of rubber was practically insoluble.

It was not until April 29, 1934, that the Producers Agreement was announced. This agreement, to which representatives of the British, Dutch, and French rubber growers, the delegate of the Government of Sarawak and the delegate of the Government of Siam were signatories, was confirmed and amplified on May 7 by the British Government draft of an Intergovernment Agreement, relating to British Malaya, Netherlands India, Ceylon, India and Burma, French Indo-China, the State of North Borneo, Sarawak, and Siam. It was signed by representatives of the governments of the United Kingdom, the Netherlands, France, India with minor qualifications, and Siam, subject to ratification, evidently promised in advance.

As stated in the preamble, the purpose of the Intergovernment Agreement, to which, it will be observed, Brazil, Liberia, the Philippine Islands, and possibly other states with unknown capacity for production are not pledged, is "to regulate the production and export of rubber in and from producing countries with the object of reducing world stocks to a normal figure, and adjusting in an orderly manner supply to demand, and maintaining a fair and equitable price level which will be remunerative to efficient producers." This is vague and general language long since grown familiar with regard to commercial products. A somewhat detailed analysis of the agreement and a survey of rubber production, exports and prices since it went into effect, on June 1, 1934, are prerequisite to a tentative appraisal of its efficacy.

MARKED DECLINES IN IMPORTS OF BOTH GOLF BALLS and tennis balls for June, 1935, as compared to the corresponding month of 1934, were reported by the United States Department of Commerce. Imports of golf balls for June, 1935, totaled 67,390, value $12,097, against 75,756, value $19,387, for June, 1934. Tennis ball imports for June, 1935, numbered 18,462, value $2,033, as compared to 79,724, value $11,897, for the June in the preceding year.

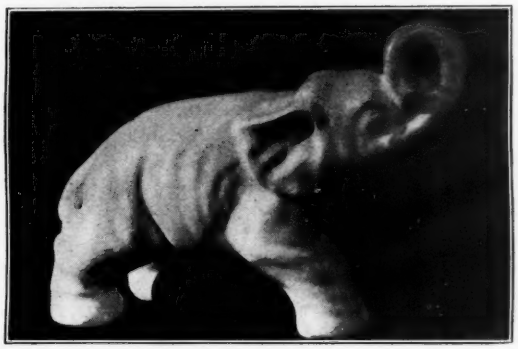
Goodyear Sold on Safety[1]

But Job Is One of Constant Reminder—Men Must Be Told, and Told Again

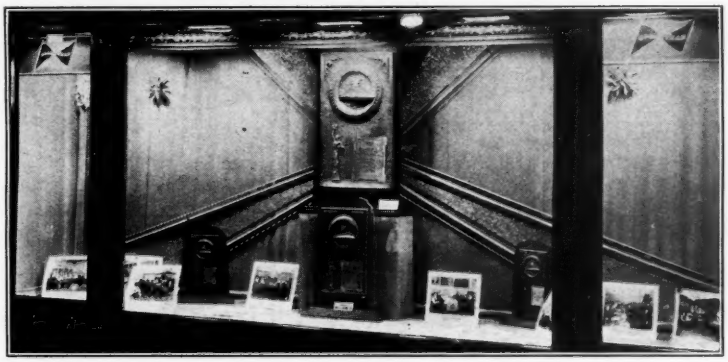
J. T. Kidney[2]

THE Gadsden, Ala., plant of The Goodyear Tire & Rubber Co., Inc., made an outstanding safety record among American plants in its industrial classification reporting to the National Safety Council in 1934, according to figures just compiled. This plant had an accident frequency rate of 0.70 and a severity rate of 0.03. For the sake of clarity it might be well to state that the Council bases the frequency rate on the number of accidental injuries per million man-hours worked, and the accident severity rate on the number of days lost per thousand hours worked.

Other plants which might wish to attain a similar degree of safety probably would find the experience of the Gadsden plant helpful. Since, however, the system in that unit is the same that applies throughout the Goodyear organization, and a broader view is offered by the work throughout the company as a whole, the Goodyear safety plan and history are very likely well worth reviewing.



The White Elephant



Display of Safety Awards for 1934 Contests and Pictures of Safety Committees

The last quarter century in the rubber industry, and more particularly the last fifteen years, has seen an increasing use of machinery replacing hand labor. That the Goodyear factory, which in 1920 required 30,000 men to turn out 30,000 tires a day, in 1930 produced 70,000 tires a day with 16,000 men was largely due to mechanization.

With the increasing use of machinery accidents became more frequent, and though organized safety work in Goodyear goes back to 1912, accident prevention became a more pressing problem.

Workmen's Compensation Law, which Ohio adopted in 1912, compelling the employer to pay for industrial accidents, gave every employer additional incentive toward safety work.

Accident prevention at Goodyear has taken two forms: mechanical and educational. The first includes placing of guards around every dangerous point and the elimination

[1] Printed through the courtesy of National Safety Council, 20 North Wacker Dr., Chicago, Ill.

[2] Manager, Employes Service Division, Goodyear Tire & Rubber Co., Akron, O.

Hazardous Mold Handling Operations

GOODYEAR ACCIDENT STATISTICS—1934

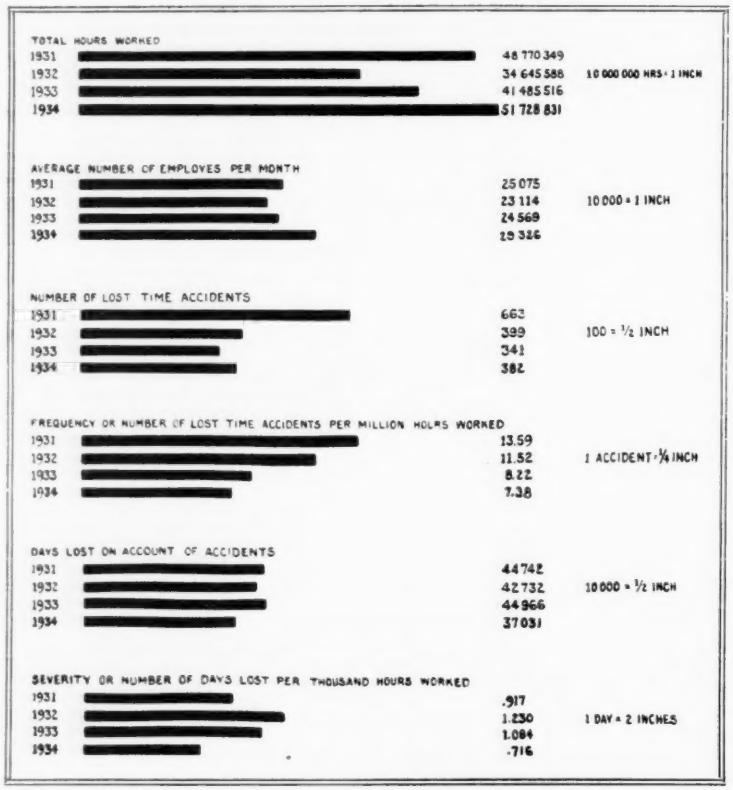
Plant	Hours Worked	Accidents	Frequency	Frequency Standing	Days Lost	Severity	Severity Standing	Frequency Severity
St. Hyacinthe	1,581,454	0	0	1	0	0	1	0
Gadsden	1,422,627	1	.702	2	42	.030	2	.021
England	3,911,620	7	1.790	6	208	.053	4	.095
Rockmart	1,616,568	4	2.474	7	71	.044	3	.109
Bowmanville	680,851	1	1.469	3	51	.075	8	.110
New Bedford	1,703,538	3	1.761	5	125	.073	7	.129
New Toronto	2,349,639	4	1.702	4	211	.090	9	.153
Cedartown	1,573,534	6	3.813	9	92	.058	5	.221
California (Cotton)	734,969	3	4.082	10	103	.140	11	.571
Argentina	957,496	6	6.266	11	109	.114	10	.714
Decatur	1,153,342	18	15.607	15	83	.072	6	1.124
Zeppelin	201,600	3	14.851	14	30	.149	12	2.213
California	2,217,446	14	6.328	12	776	.350	13	2.215
Akron	27,762,370	210	7.564	13	27,183	.979	15	7.405
Atco	1,224,770	4	3.266	8	6.040	4.392	17	16.108
Australia	1,950,089	71	36.409	16	885	.454	14	16,530
Wheeling Township Coal Mining Co.	686,918	27	39.320	17	1,022	1.487	16	58.470
Totals	51,728,831	382	7.385	..	37,031	.716	..	5.288

of every possible hazard. To see that this work is done are two full-time safety engineers who direct safety work in the plant. Also there is a safety committee in each of the nine production divisions at Akron, composed of department foremen who meet once a month. Besides an inspection committee composed of one supervisor, one piece worker, and one member of the Industrial Assembly, Goodyear's form of shop council, who inspect every part of the department each month, make recommendations to the divisional safety committee.

Here are items on a typical report: "Safety glass is loose in emery wheel frame;" "Several loose floor boards around number one tank;" "Sign is off wall above hospital stretcher near third floor elevator shaft;" "Mill bar left leaning against housing of No. 464 mill;" "Guard around No. 28 line motor transmission loose;" "Temporary floor around pipe at corner of No. 201 mill is a tripping hazard."

Copies of the inspectors' report go to the safety committee, to the foremen concerned, and to the Safety Department. The entire committee may look over the worn flooring, decide whether it needs repair or replacement. The emery wheel frame is ordered repaired at once. The man who left the mill bar where it might cause an accident may be reprimanded. In any case the entire report is brought up at the next meeting to make sure that each item has been disposed of.

All overhead tracks, trolleys, cranes, and chain blocks are inspected monthly by the Engineering Departments. Air and steam pressure equipment is given a thorough inspection once a year. Considerable machinery has been redesigned with the idea of lessening the risks. Special hooks were worked out for handling molds and air hoists. The adoption of lift trucks to handle molds on skids practically eliminated one group of accidents.



Goodyear Accident Statistics—1931-1934

There is a suggestion system at Goodyear, and this brings in many safety ideas since the company pays not only for suggestions which make production more efficient, but also those that make it safer.

However no plant can be made foolproof. Men must operate machines and move loads, and men grow careless. Though Labor Training men who break in new help or transfers emphasize safety in their instruction, accidents still happen—in fact, they are somewhat more frequent among the experienced men who, being human, grow careless.

Consequently the main reliance of the company in accident avoidance is education. And here the job is one of constant reminder. For men know what things to do and what not to do, if they will only stop to think. The trouble is to make them stop. It doesn't do to tell them *once* to be careful. They must be reminded again and again. Educational work must be continuous. Because men soon get used to seeing the same message, there must be a thousand variations in the text of the reminders. Color, animation, pictures, change of pace—all these principles must be used to catch the attention of men at work, to buttonhole them and remind them so vividly to be careful that the impression will linger until time to tell them again. Primarily safety education is an advertising job.

So there are bulletin boards in each gate house, which not only talk generally about safety, but specifically list the number and circumstances of accidents which happened during the preceding month. Each of the 57 time clocks around the Akron plant has space above for a 9 by 12 poster. Most men look at the clock; so most of them see the posters. These are striking and attractive in design, have a weekly change of copy. In addition 200 posters 17 by 23 in size are distributed bi-monthly to be placed on the department bulletin boards.

In each department are signs giving the record of that department in safety, so many accidents in so many months. Departments that have gone for a considerable period without any accidents have conspicuous signs, "This department has operated .... days without an accident," the figures being changed every morning.

Contests have been a big help. These are held between departments, between plants. The seven Goodyear cotton mills compete among themselves for the Slusser Safety Banner which moves from time to time from one plant to another. Safety trophies in the form of plaques are awarded at intervals to the winners of departmental and interplant contests.

Ratings are based on the factor of frequency and severity. Where two or more plants or departments have had no accidents, and so have a perfect score, the winner is the one with the largest average number of hours worked.

Another useful thing is the white elephant, a metal statuette which reposes conspicuously on the desk of the division head whose departments have had the worst safety record during the previous month. Every production head wants to get rid of the white elephant on his desk, bears down harder to keep his record clear.

The factory paper, *The Wingfoot Clan*, keeps the idea of safety before the men in editorials, cartoons, articles about the contests giving the standings of each group, together with actual stories from time to time of accidents which could have been avoided and steps taken to prevent recurrence.

Goodyear subsidiary factories outside of Akron, in England, Australia, Canada, Argentina, Java, and two in the United States, employ a similar system of accident avoidance, with modifications to fit the local conditions.

Accidents do happen in spite of everything; so a first-class hospital is maintained at Akron. When P. W. Litchfield, now president, came to Goodyear as superintendent in 1900, he found a first-aid kit in his office, its principal equipment being a bottle of whiskey, sovereign remedy for many ills. He substituted spirits of ammonia for the other spirits, and this seemed not only equally efficacious, but also cut down the number of calls for help.

The first-aid kit has expanded since then. The hospital has complete modern equipment for X-ray and physiotherapy work, a twelve-bed ward, and a complete dental office. The hospital staff includes five doctors, a Roentgenologist, physiotherapitist, laboratory technician, a dentist, and sixteen nurses. First-aid cabinets as well are located in more isolated portions of the plant.

Fibroskin

Dr. Ernst A. Hauser has described[1] a new artificial leather made with latex and patented by Gartner and Ruch, called Fibroskin. The process is based on the combination with latex of parallel fibers. The quality of the product can be altered by varying the proportion by weight of the parallel fibers and latex and by using several plies. When several layers are used, they can be superimposed so that the direction of the fibers of the individual layers are at right angles to each other, thus giving a material with equal tensile strength in both directions.

Any type of fiber may be used, but for the present the inventors utilized cotton fiber fleece. In a special impregnating apparatus, this fleece, in which the fibers are parallel, is impregnated with a suitable Revertex compound. The water is then removed, leaving each fiber covered with rubber. This material, which is about 0.3 to 0.4 mm. thick, can immediately be vulcanized in dry hot air. The resultant product, known as Fibroskin, has high tensile strength in the direction of the fibers and a high degree of extensibility in the opposite direction. Owing to its great plasticity before vulcanizing, it takes an excellent grain and also admits of any shaping desired.

[1] *Kautschuk*, Oct., 1932, pp. 158-59.

Compounding Ingredients

(*Continued from page 36*)

PROPERTIES. Sp. gr., 1.25. Stable. Odorless. Non-toxic. Color light tan to white. Texture very soft. Average moisture content 5%.
PURPOSE AND FUNCTION. Inert filler, hardness, finish, dielectric strength neutral.
METHODS OF USE. Add directly to the rubber.
VULCANIZATION. No effect on cure.
PATENTS. Not disclosed.

Wood Flour, Grade 2

Same as Wood Flour, Grade 1, except the maximum particle size is 80 mesh.

Wood Flour, Grade 3

Same as Wood Flour, Grade 1, except the maximum particle size is 100 mesh.

Wood Flour, Grade 4

Same as Wood Flour, Grade 1, except the maximum particle size is 300 mesh.

Zinc Stearate

CHEMICAL COMPOSITION. Zinc stearate.
SELLER. Whittaker, Clark & Daniels, Inc.
APPLICATIONS. All stocks.
PHYSICAL STATE. White powder.
PROPERTIES. Sp. gr., 1.05. Solid. Odorless. Non-toxic.
PURPOSE AND FUNCTION. Stabilizing curing properties, and dusting uncured surfaces.
METHODS OF USE. Add directly to the rubber or dust on surface.
VULCANIZATION. Assists curing.
PATENTS. None.

Addenda—Softeners

Black Diamond Mineral Rubber

CHEMICAL COMPOSITION. Bitumen petroleum product.
SELLER. Wishnick-Tumpeer, Inc.
APPLICATIONS. Footwear, belting, packing, hose, molded articles, heels, soles, insulation and extruded products, tire treads.
PHYSICAL STATE. Solid or granular.
PROPERTIES. Sp. gr., 1.02 to 1.03. Melting ranges, solid, 121.11 to 176.6° C. (250 to 350° F.). Granular, 148.89 to 176.6° C. (300 to 350° F.). Stable. Odor slightly oily.
PURPOSE AND FUNCTION. Softener for rubber. Improves tensile, tear resistance, and aging.
METHODS OF USE. Add directly to the rubber.
VULCANIZATION. Does not alter rate of cure.
PATENTS. Not disclosed.

(*To be continued*)

Annals of Rubber[1]

Chronological Record of the Important Events in the History of Rubber

1874. American Rubber Co., Cambridge Port, Mass., organized by Robt. D. Evans to make wringer rolls, later expanded its products to include boots, shoes, and clothing.

1875. G. Bouchardat derived caoutchouc and dipentene from isoprene.

Home Rubber Co., Trenton, N. J., was established by Charles E. Stokes to manufacture mechanical rubber goods.

1876. Henry Wickham brought to England 70,000 seeds of *Hevea Brasiliensis*, which he collected from the Tapijos River section in the Amazon valley. Plants from these seeds were planted at Kew Gardens and later in Ceylon. These trees were the basis of the plantation rubber industry in the Far East.

William Kiel, superintendent, Rubber Comb & Jewelry Co., Butler, N. J., invented the first tubing machine for extrusion of rubber in hard rubber manufacture.

1879. Parker Stearns Co., Brooklyn, N. Y., was established to manufacture druggists' sundries.

N. C. Mitchell patented acid process of removal of fiber from vulcanized rubber scrap.

1880. Boston Woven Hose Co., Cambridge, Mass., was established by Theodore A. Dodge for the manufacture of cotton rubber-lined fire hose. In 1888 it was reincorporated as Boston Woven Hose & Rubber Co. to manufacture a full line of mechanical rubber goods.

Diatomaceous earth was used by A. B. Jenkins as a rubber compounding ingredient.

Rubber and cork composition was manufactured by Britannia Rubber & Kamptulicon Co. as a floor covering.

Thermoid Rubber Co., Trenton, N. J., was formed to make mechanical rubber goods.

Canfield Rubber Co., Bridgeport, Conn., was founded by Jared H. Canfield for the manufacture of mechanical rubber goods.

1881. T. Rowley vulcanized rubber in an atmosphere of ammonia.

1883. Charles Moseley obtained a British patent for printing on a rubber surface coated with farina.

1884. Moureley vulcanized rubber with sulphur in a 12% ammonia solution or in ammoniacal vapors.

W. A. Tilden prepared caoutchouc and dipentene from turpentine.

U. S. Rubber Reclaiming Co., New York, with plant at Buffalo, both in N. Y., was established by Rudolph and Max Loewenthal.

The India Rubber Journal, London, England, was founded in August, 1884.

Macintosh first brought out cushion tires for bicycles.

1885. R. Dick secured British patent for use of gutta percha for power transmission belting.

1886. *Gummi-Zeitung* was founded in Berlin. It is the organ of the rubber and asbestos industries in Germany.

1887. O. Wallach produced caoutchouc from isoprene.

Gutta Percha & Rubber Mfg. Co. of Toronto, Ltd., was organized by Amedee Spadone and H. D. Warren for the manufacture of mechanical rubber goods.

1888. J. B. Dunlop patented a pneumatic bicycle tire (British patent No. 10,607).

J. H. Gladstone and W. Hibbert published important work on the chemistry of rubber.

1889. W. E. Bartlett invented the clincher-type detachable pneumatic tire.

India Rubber World, New York, N. Y., was started: H. C. Pearson, founder and editor (1889 to 1917); William M. Morse, editor (1917 to 1935). It was the first trade publication established in the United States devoted to the rubber industry.

H. O. Canfield Co., Bridgeport, Conn., was established by H. O. Canfield to make mechanical rubber goods.

1890. Nathaniel G. Mitchell, of Philadelphia, Pa., secured United States patent No. 332,455 for a method of production of restored or devulcanized rubber. The principal feature claimed consists in devulcanizing the rubber by the action of live steam; then while the rubber is yet moist, rolling it until reduced to a powder; and finally drying the powder and at the same time keeping it in motion to preserve the powdered condition.

C. K. Welch, Coventry, England, patented the principle of a "wired on" type of detachable tire having a cover of canvas and rubber that encased an inner tube.

1891. Thomas B. Jeffery developed the clincher-type of tire in 1891-1892 under U. S. patent Nos. 434,115, 466,565, and 466,789.

1892. Thos. Robbins, Jr., designed and built the first thick-center trough conveyer belt.

William Tilden synthesized rubber from isoprene.

United States Rubber Co. was incorporated under the laws of New Jersey. This big rubber shoe combination was capitalized at $50,000,000 and organized to begin March 30, 1892, and terminate March 30, 1942, a period of 50 years. The combination included control of nine manufacturing rubber boot and shoe concerns: namely, American Rubber Co., Boston, Mass.; Boston Rubber Co., Boston; L. Candee & Co., New Haven, Conn.; Goodyear's Metallic Rubber Shoe Co., Naugatuck, Conn.; Lycoming Rubber Co., Williamsport, Pa.; Meyer Rubber Co., New Brunswick, N. J.; National India Rubber Co., Bristol, R. I.; New Brunswick Rubber Co., New Brunswick; and New Jersey Rubber Shoe Co., New Brunswick.

1893. The exhibition of the first cord tire at the Philadelphia Cycle Show in 1893 undoubtedly marked a turning point in automobile tire development.

Manhattan Rubber Mfg. Co., Passaic, N. J., was organized by F. C. Jones.

Pardon W. Tillinghast patented the "single tube" bicycle tire.

John F. Palmer patented in the United States and Great Britain a weftless tire fabric used first in bicycle path racing tires. The principle was applied to tires for all purposes, including automobile tires of all types.

(*To be continued*)

[1] Continued from India Rubber World, Aug. 1, 1935, p. 42.

Koroseal—a New Plastic[1]

Some Properties and Uses

S. L. Brous and W. L. Semon[2]

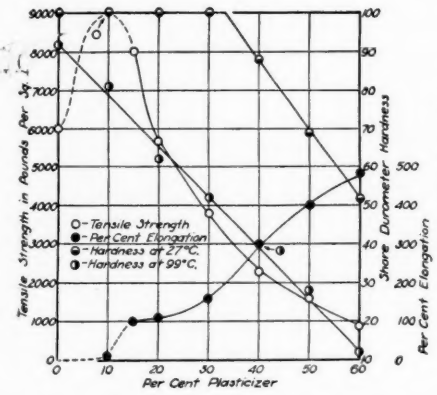


Fig. 1. Effect of Proportion of Plasticizer on Tensile Strength, Elongation, and Hardness of Koroseal

THE following concludes the highly informative article on the properties and uses of Koroseal begun in our September issue.

Physical and Chemical Properties

The tensile strength of Koroseal compounds may be varied within wide limits. Figure 1 shows that the tensile strength is dependent upon the proportion of plasticizer present and decreases as the latter is increased. A study of the curve will show an apparent discrepancy, in that the tensile strength increases to a maximum and then falls off. This is readily explained by the fact that compounds containing less than 15% plasticizer are so hard to work that it is practically impossible to obtain a homogeneous test piece.

As might be anticipated, the hardness decreases as the proportion of plasticizer is increased. It is interesting to note that, measured at room temperature with a Shore soft rubber durometer, the decrease in hardness is not apparent until more than 30% plasticizer has been added. However, when measured at an elevated temperature, the hardness decreases uniformly with increased percentages of plasticizer.

Elongation is an inverse function of tensile strength. This condition might also be expected from the nature of the material.

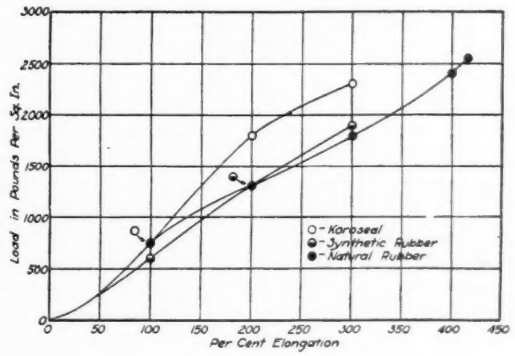


Fig. 2. Comparison of Stress-Strain Characteristics of Koroseal and of Synthetic and Natural Rubber Compounds Designed for Service in Oil

Shown in Figure 2 are the stress-strain characteristics of Koroseal, synthetic rubber, and natural rubber compounds. For the comparison to be fair it was made on compounds designed for and actually being used in contact with oils.

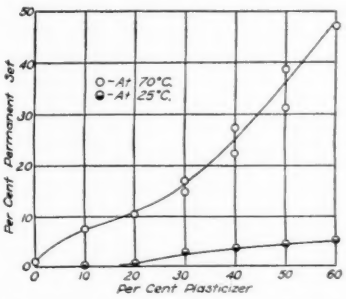


Fig. 3. Permanent Set of Unpigmented Koroseal

The relation of permanent set to proportion of plasticizer in the compound is illustrated in Figure 3. This characteristic was measured by cutting one-inch-square samples from $^3/_{32}$-inch sheets, placing these between smooth, flat, steel plates, and loading them under spring pressure to 400 pounds per square inch. The samples were then placed in an oven at 70° C. (158° F.) for 22 hours. Ten minutes after their removal from the oven the decrease in thickness was measured on a Randall-Stickney gage. The permanent set is expressed as percentage decrease of original thickness. The tests were repeated at room temperature (average 25° C.). It should be pointed out that these tests were more severe than are ordinarily encountered in most types of gasket service, and that at lower temperatures and pressures the set is practically nil. A

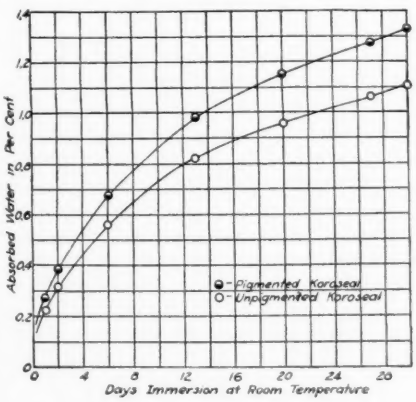


Fig. 4. Water Absorption of Koroseal

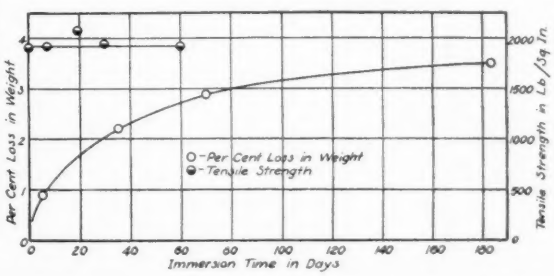


Fig. 5. Effect on Koroseal of Immersion in Mineral Oil

[1] Presented before the Division of Industrial and Engineering Chemistry at the eighty-ninth meeting of the A. C. S., New York, N. Y., Apr. 22 to 26, 1935. Reprinted from *Ind. Eng. Chem.*, June, 1935, pp. 667-72.

[2] B. F. Goodrich Co., Akron, O.

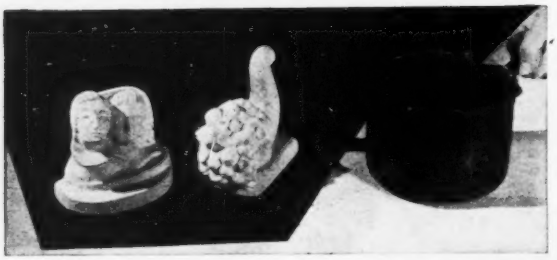


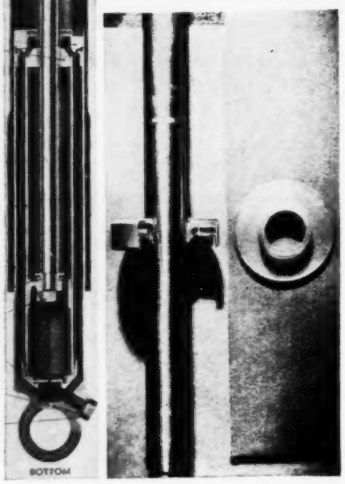
Fig. 6. Plaster Casts and Koroseal Molding Jelly

low-set rubber motor support stock adapted for compressive service, when tested as above, showed 4.17% set at the elevated temperature and 1.04% set at room temperature.

The impact strength at room temperature of the harder compounds approximates 100 inch-pounds per square inch of cross-sectional area. Obviously the softer compounds are not shattered on impact. Hard rubber stock used next to the metal rim of solid tires averages 35 inch-pounds per square inch.

Koroseal, like most materials containing a high percentage of halogen, will burn only when held in direct contact with a flame.

The dielectric strength or breakdown voltage varies from that of the plasticizer to above 1,000 volts per mil with decreasing plasticizer content (determined at 60 cycles on sheets of 0.050-inch thickness).



Spicer Mfg. Co.

Fig. 9. Koroseal Sealing Member on Reciprocating Piston

Low water absorption by Koroseal is indicated by Figure 4. Results of immersion of two compounds are shown. The lower curve represents an unpigmented stock having a durometer hardness of 75; while the upper curve represents the same stock to which has been added 25% by weight of African blue asbestos. Although the curves have not become asymptotic in the immersion time indicated, experience has shown that water is not continually absorbed.

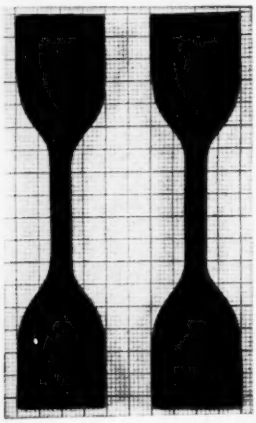
In flexing tests duplicating the actual service for which Koroseal and rubber units were designed, the rubber unit failed after 300,000 flexures, whereas the Koroseal compound was taken out of test while still serviceable after 3,000,000 flexures.

Uses

Resistance to moisture and stability over a wide range of operating temperatures make the extremely soft varieties of Koroseal ideal for matrix material for molding plaster of Paris and cement ornaments. Glue compositions used for this purpose frequently must be adjusted to the weather; while a single Koroseal compound will retain its desired properties throughout seasonal changes. Furthermore recent researches on plaster of Paris have made new and better products available to the plaster-casting industry, but these new products cannot be used successfully in glue composition molds because the relatively high heat of hydration accelerates the already rapid loss of mold detail. Koroseal overcomes these difficulties, as evidenced by regular factory operations in which over five hundred casts have been made in a single mold; whereas glue molds formerly used were discarded after less than one-tenth as many castings. Figure 6 shows a sample of Koroseal casting jelly, together with casts which have been taken from molds. Figure 7 shows a mold which has been used in production. This photograph illustrates to a certain extent the mold detail obtainable. There is no loss due to obsolete or misused molds since the material may be recast a great number of times without impairing its properties.

Fig. 7. Fine Detail from Koroseal Mold

The resistance to swelling and disintegration of Koroseal by vegetable and mineral oils is remarkable. In Figure 5 the changes in weight and tensile strength have been plotted against time of immersion at room temperature. In these tests a light paraffin-base oil (viscosity, 100 Saybolt seconds at 100° F.) and a heavy mineral oil (viscosity, 160 to 200 Saybolt seconds at 210° F.) were used. The effects of the two oils are so nearly the same that the two curves are superimposed. Therefore only the light oil has been recorded on the graph. Unlike other rubber-like materials, Koroseal shows a loss of weight and, instead of swelling, a slight shrinkage in volume when in contact with oils. This characteristic becomes progressively more apparent as the temperature is raised. However in service tests where the temperature has risen to approximately 75° C. (167° F.), the material has maintained original properties to a surprising degree.



Original — After sixty days in oil at room temperature

Fig. 8. Koroseal Dumbbell Test Strips before and after Immersion in Oil

Figure 8 shows two

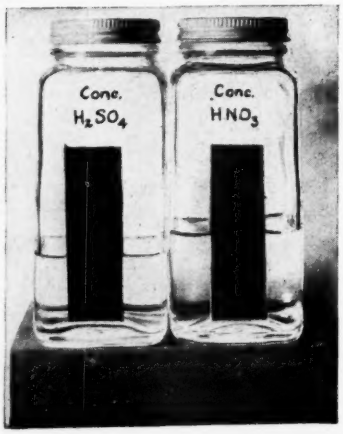
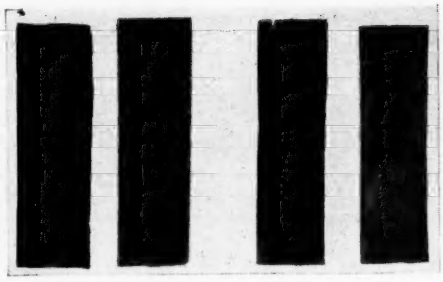


Fig. 10. Koroseal and Acid after Thirty-Day Immersion

test sections: one is original and the other has been immersed in the light oil, mentioned in the foregoing, for 60 days. Comparison of the two samples will give some idea of the volume change. It has been shown previously (Figure 5) that the tensile strength is substantially unaffected in the same test.



A. Concentrated sulphuric acid at room temperature. B. Concentrated nitric acid at room temperature. C. 46% sodium hydroxide at room temperature. D. 46% sodium hydroxide at 70° C.

Fig. 11. Koroseal Stocks after Immersion in Corrosive Chemicals for Thirty Days

As a gasket or a sealing member working in oil, Koroseal has been adapted to many uses. Notable among these are drip-proof service in flanged oil piping operating at 150 pounds per square inch pressure where some fifteen or twenty other materials, including paper, asbestos, rubber compositions, synthetic rubber-like products, and duck-inserted rubber, had failed; sealing members on reciprocating pistons (Figure 9) where after 17,000,000 four-inch strokes no leakage could be detected; and transformer gaskets where service conditions are quite severe.

From the inertness of the base material one might readily anticipate the resistance of Koroseal to corrosive chemicals. Figure 10 shows test strips immersed in concentrated nitric and sulphuric acids after 30 days at room temperature. It is apparent that there is no discoloration of either acid. Figure 11 shows the strips of Figure 10 after removal from the acids, together with two strips which had been in 46% sodium hydroxide. Although at elevated temperatures, the alkali discolored the surface of the specimen, the physical properties were in no way impaired, and there was no discoloration of the solution. Figure 12 pictures a container which had held chromium-plating solution at 75° C. (167° F.) for 11 months. The inner surface was somewhat roughened by deposited salts, but the container was still flexible, as is shown in Figure 13.

Koroseal tubing has been used in the laboratory for transferring chlorine gas, ozone, and sulphur chloride and shows no apparent deterioration in such service. Ball valves of Koroseal have been used for sealing outlets in chlorine-water tanks.

Koroseal compounds are extremely resistant to aging and light-cracking, both natural and accelerated. Samples which have been continuously exposed to Akron weather for over two years are still quite flexible and show no surface checking or cracking. Figure 14 illustrates the remarkable superiority of the new product over cured rubber in this test. Exposure to ultra-violet light from a mercury vapor lamp for 144 hours showed no effects; 96 hours in the Bierer bomb also was without effect.

Fig. 12. Koroseal Container after Holding Chromium-Plating Solution at 75° C. for Eleven Months

Fig. 13. Distortion to Show Flexibility of Koroseal Container

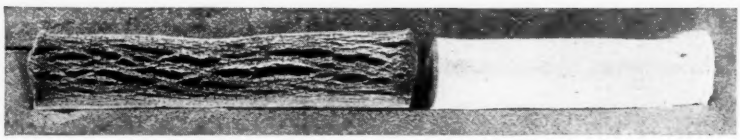


Fig. 14. Samples of Rubber (*Left*) and Koroseal after Two-Year Roof Aging

Koroseal is not recommended where service conditions require complete immersion in organic compounds containing nitro or chlorine groups, aliphatic and aromatic ketones or esters, aromatic amino compounds, and the lower aliphatic acids. Exclusive of these, the material is resistant to all the well-known commercial heavy chemicals.

A great many other applications of Koroseal suggested by its unique combination of properties have been rather fully investigated and give promise of extensive commercial utilization.

New Uses of Rubber

(*Continued from page* 32)

though we were in the throes of an economic depression, we used 12% more rubber than in 1929, or 963,000 tons. If all the rubber used in 1934 was put in one place, it would make a solid column as high as the Empire State Building, 1,273 feet, and 173 feet square. If the entire liquid latex used in 1934 was released, it would equal in volume a 5-minute flow of water over Niagara Falls. From this comparison it is evident that the new uses of rubber continually being developed are increasing rubber production considerably.

The natives of Brazil were proud of their rubber shoes. They could walk along the jungle trails without bruising their feet. Likewise we of the rubber industry are proud of our contributions to this fast-moving world of today. Our new products fill the needs of a modern civilization.

Impregnating Textiles

Following is a description of one method of carrying into effect a recently patented method of treating textile materials with vulcanized latex. The impregnating process is carried out by subjecting yarn on bobbins in a closed vessel to a vacuum of 28 inches of mercury, then introducing vulcanized rubber latex into the closed vessel so as to cover the bobbins and subjecting the latex to a pressure of 100 pounds per square inch for 15 minutes. The latex is then withdrawn, and vacuum again applied. This sequence of operations is repeated twice. The bobbins are then subjected to vacuum to remove excess of vulcanized latex; after which operation the impregnated yarn is dried in a humid atmosphere containing ammonia gas. The impregnated yarn is moved meanwhile so as to prevent drainage therefrom of excess of the rubber dispersion.

EDITORIALS

Forty-six Years of Age

WITH this issue INDIA RUBBER WORLD begins its forty-seventh year of purposeful existence. It is interesting to review the original objectives as set forth in the first edition of this pioneer publication October, 1889. The announcement reads in part, as follows:

"It aims to embrace all procurable information regarding the uses of india rubber and gutta percha in the arts and manufactures . . . and to aid materially the scientific and the mechanical development of business in india rubber, gutta percha, and kindred products, by giving the manufacturer all meritorious information procurable as to old and new methods and compounds. . . . We shall take pains to add in every way to the store of the rubber worker by detailing the result of practical experimentation according to satisfactory formulae and desirable patented processes."

More interesting still is the fact that these simple policies were sufficiently sound and comprehensive to serve without amendment throughout all the intervening years, as has been true also of the name and the period of issue of the magazine. Steadfastly adhering to these principles with the idea of serving the best interests of the rubber industry in all its phases rather than to shape them has brought to INDIA RUBBER WORLD an enviable reputation for progressive versatility, conservative impartiality, and dignified leadership in its field. Through years spanning the greatest extremes of economic conditions and the unparalleled growth of the knowledge and application of rubber, these aims have added accumulatively to the character and prestige of this publication; nor can this point be passed without acknowledging the inestimable importance of the support and cooperation that has been given so graciously by those with interests in the rubber industry.

True it is that changes have occurred in the style and the character of coverage of the articles and departments of the paper from time to time, but these are only a reflection of the changing interests that mark growth and progress in this still youthful industry. Latex was formerly covered merely as a step toward crude rubber production; now interest resides in it as a raw material for the manufacture of goods that open vast new fields for rubber application. The discontinued *laissez-faire* governmental policies regarding labor give rise to controversial problems of employe-employer relations which demand the intelligent study and attention of workers, supervisors, and executives alike. Commodity regulatory schemes affecting markets and the underlying economics of business, the accelerated pace of science, mechanical and process invention, and activities concerned with increased effectiveness of manufacturing are all examples of the changing requirements of the rubber business.

There probably has never been a time when executive leadership has been at such a high premium, when it was so necessary to give attention to ways and means of developing the minds of all classes of men in industry. The contents of every issue of INDIA RUBBER WORLD are planned to help in this undertaking. Have you considered making its broadening influences regularly available to more of your scientists, engineers, foremen, and workers?

Japanese Thread

RUBBER thread imports, if any, have never been of sufficient volume to warrant the Department of Commerce to classify them as such. Is this condition to continue or not?

A friend of the rubber industry of the United States permitted our examination of an excellent array of rubber thread samples from Japan, which had cleared through U. S. Customs free. The communication referring to these articles indicated a desire to extend the sale of them "extensively in your territories" and also referred to "our unique prices."

Rubber men whose attention has been drawn to this circumstance share our opinion that the rubber associations and our government agencies should evolve an organized plan whereby rubber manufacturers and others would be informed of the approach of ruinous foreign competition while it is yet in the "sampling stage." Unfortunately the warning usually comes only when our manufacturers discover that their outlets are gone because the domestic merchants' shelves are already filled with imported goods for sale at prices below our costs.

The enterprise of the Japanese business man is well understood, but our standards of living can be maintained only by meeting such situations with properly timed initiative.

D C McPoberts

EDITOR

What the Rubber Chemists Are Doing

A. C. S. Rubber Division Meetings

THE Rubber Division, A. C. S., did not participate with the main society in its San Francisco meeting of August, preferring to arrange a special meeting at Akron, O., scheduled for September 30 and October 1, 1935. The Hotel Mayfair was selected as meeting headquarters. The program included eleven papers. The first day's sessions closed with a banquet held in the Mayfair ballroom. Those of the second day were followed by a business meeting. Abstracts of the papers of both sessions follow.

Abstracts

A Rapid and Practical Method for the Determination of Free Sulphur in Rubber. An accurate and rapid method of determining free sulphur in rubber. By the use of the procedure described it is possible to determine the free sulphur in a soft rubber sample in less than three hours' time. E. W. Oldham, L. M. Baker, and M. W. Craytor.

The Determination of Guanidines in Rubber Stocks and the Consumption of Guanidines during Cure. 1. When an uncured stock containing D. P. G. or D. O. T. G. is extracted with acetone the guanidine is not completely removed. This is also true of a mixture of guanidine in acetone-extracted rubber. 2. Because the guanidine may be completely recovered when the uncured stock is treated with a weak hydrolyzing agent, such as very dilute acid, it is believed that a complex is formed between a part of the guanidine and some ingredient of the crude rubber. 3. This compound or addition product is gradually destroyed during the cure, but exists well beyond the optimum cure. In cured stocks acetone extraction does not recover this bound guanidine. 4. A new analytical method of determining guanidines has been developed involving a hydrolytic treatment of the stock with benzene and dilute hydrochloric acid. This method removes the combined guanidine and, in general, gives higher, more consistent, and more satisfactory results. 5. A range of cures of different stocks has been analyzed both by this method and by the Wistinghausen (acetone-extraction) method in order to compare the accelerator consumption curves obtained by each method. Bingham J. Humphrey.

AXF—A New Plastic Material. A new class of elastic plastic materials very resistant to the action of many solvents and chemical reagents may be prepared by reacting an ethylene dihalide in the presence of aluminum chloride with an aromatic hydrocarbon having the general formula $R\text{-}C_6H_4\text{-}R_1$. R and R_1 each stand for hydrogen or an aliphatic hydrocarbon radical containing two or more carbon atoms. The properties of the plastic make it especially interesting as a compounding ingredient for use with natural or synthetic rubber. The resistance to ozone cracking, the flexibility, and the breaking elongation of oil and gasoline resistant semi-hard rubber stocks containing 15 to 20 parts of sulphur per 100 of rubber may be increased by the addition of AXF to the compound. A moderate amount of flexibility and stretch is possessed by hard rubber made from equal weights of rubber and AXF. As a compounding material with DuPrene, AXF is superior to factice in several ways. For instance, it yields a product more resistant to the action of gasoline and oils. AXF has an excellent plasticizing action both on DuPrene and on the ethylene polysulphide plastics known as Thiokol. With the latter, its inertness causes it to be preferred to rubber for use in this capacity. S. D. Shinkle, A. E. Brooks, and G. H. Cady.

Raman Spectrum of Rubber and Some Related Hydrocarbons. A Raman line spectrum has been secured for rubber and balata by using clear gels of the purified hydrocarbons. It was not found possible to eliminate the background entirely. The most intense frequency for both rubber and balata is the same, 1,672 cm^{-1}, ascribed to the double bond. Comparison of the frequencies for rubber and balata with those of trimethyl ethylene, myrcene, isoprene, and limonene shows that the primary linkages in rubber are very similar to those in trimethyl ethylene, thus supporting the view that the rubber molecule consists of a long chain of isopentene units. The spectrum of balata shows differences from that of rubber such as might be expected from a cis-trans relation. A spectrum of myrcene is largely a superposition of the isoprene and trimethyl ethylene spectra. S. D. Gehman and H. J. Osterhof.

An Impact Cutting Test for Tire Tread Stocks. The problem of tire tread cutting is discussed in relation to the various measurable characteristics of rubber stocks such as tear resistance, cracking resistance, and hardness. Theoretical reasons are given for selecting a high speed, high load, knife-impact test for the laboratory evaluation of the cutting resistance of tread stocks. The impact cutting device used in this work is described in detail, and results obtained with it are discussed in their relations to the physical variables involved, compounding treads, and road tests. J. H. Dillon.

Oxygen Absorbers and Their Effect in Rubber. The cracking of vulcanized rubber, in particular rubber compounded with carbon black, when subjected to oft-repeated dynamic strain, is discussed, and a new, chemical means of reducing flex-cracking tendency is described. The new method consists in the addition to the rubber compound of organic materials which absorb oxygen in the presence of a base, and is founded on the theory that oxygen dissolved in the rubber and absorbed or otherwise held by compounding ingredients such as carbon black plays a part in the causation of flex-cracking and should be removed. The conditions under which these oxygen absorbers are most effective are described, and the results obtainable from pyrogallol-ethanolamine and pyrogallol-quinol-ethanolamine combinations are shown. Factors which influence the tendency to flex-crack, such as the amount of carbon black and the sulphur ratios used, are discussed, and a laboratory method of evaluating flex-cracking is described. A. A. Somerville.

The Chemistry of Soft Rubber Vulcanization. V. Experiments on the Treatment of Dilute Rubber Cements with Sulphur Chloride. The results of these experiments indicate that the main vulcanizing effect of sulphur chloride is a reaction other than addition to the hydrocarbon. Although the individual molecules appear to undergo this reaction, no vulcanized structure is established when the molecules are separated from one another. This structure is apparently established by mechanical interlocking of the molecules. The results are explained by two assumptions: (1) that sulphur chloride catalyzes geometrical rearrangement at some of the double bonds causing kinking of the molecules and (2) that, under favorable conditions, the molecules again become straight by rotation at single bonds under the influence of thermal agitation. B. S. Garvey, Jr.

Effect of Different Temperatures and Oxygen Pressures on Rate of Aging of

Soft Vulcanized Rubber. It is of great importance to the manufacturer and consumer of rubber goods to have available suitable standardized accelerated aging tests whereby the life of rubber articles may be predicted under the variable storage and service conditions encountered. In general, the Bierer and Davis oxygen bomb test has proved most suitable for this purpose. Studies carried out show that the rate of aging of rubber does not vary in direct ratio with change in oxygen pressure. Little difference is found in the rate of aging at 50 to 100 pounds per square inch oxygen pressure. Increased temperature, however, causes increased aging rate. It appears that the quantity of rubber aged in the bomb at one time does not affect aging rate, or does periodic changing of the oxygen cause aging variations. The aging of stocks containing various antioxidants at one time or together with stocks containing no antioxidants may cause variations in aging rate. The air bomb test appears to be extremely useful in predicting the life of inner tubes. However its general use offers certain hazards because of the high temperatures employed. A restandardization of the oxygen pressure test using lower pressures would make possible the use of less cumbersome equipment than is now used and should eliminate the need of the many safety precautions with which the test method is now surrounded. More rapid aging rates can be attained by slight increases in temperature without increasing hazards of the test appreciably. J. H. Ingmanson and A. R. Kemp.

Diffusion of Water through Rubber, Synthetic Resin, and Other High Polymeric Materials. Measurements have been made on the rate at which water passes through various organic insulating materials including hard and soft rubber, submarine cable insulation, phenol fiber and similar materials, cellulose acetate and related substances, asphalts and pure hydrocarbons such as polystyrene, balata, and petroleum wax. A diffusion constant has been calculated for each by means of Fick's linear diffusion law. This method of expressing the rate of diffusion permits the comparison of one material with another and possesses many advantages from a practical standpoint. If, for example, the diffusion constant for a material is known, it is possible to calculate the thickness necessary to protect a given piece of apparatus, or the time during which a given thickness will be effective, under known conditions of temperature and humidity. The diffusion constant is particularly applicable to calculations involving insulations in various geometric forms such as that on a cable. Equations have been derived covering the more common geometric forms and the more usual conditions. The data presented show a variation in the diffusion constant of different organic materials ranging from 6.2×10^{-10} for a hydrocarbon wax to 1.6×10^{-4} gm/hr./cm./mm. mercury for cellulose acetate. The rate of diffusion through non-sorbing materials was found to vary inversely with the first power of the thickness; while the rate through sorbing materials was found to deviate from the first power owing to retention of moisture and to the establishment of a non-linear concentration gradient. The rate of diffusion through non-sorbing materials is shown to vary directly with the vapor pressure, but in the case of sorbing materials to be influenced by the distribution of water within the sample. It is also shown that the rate of diffusion is linearly proportional to the vapor pressure at pressures below that of the water soluble constituents in rubber and to deviate markedly from linearity at pressures above. Measurements were made on the amount and distribution of water in rubber under diffusion conditions. The percentage moisture retained was found to increase with thickness and to be distributed in accordance with established concentration-pressure relation. Various concepts involving sorption and diffusion processes are discussed as bearing upon the mechanism of moisture diffusion through organic substances. R. L. Taylor, D. B. Herrmann, and A. R. Kemp.

Notes on the Determination of Sulphur in Rubber Compounding. A description of the use of picric acid as an aid in determination of sulphur as barium sulphate. The addition of picric acid to the sulphate solution prior to the addition of barium chloride eliminates the necessity of prolonged digestion before filtration. C. Herbert Lindsly.

New York Group

THE New York Group, Rubber Division, A. C. S., will hold its fall dinner meeting Friday, October 11, 1935, at 6.30 p.m. in the clubrooms, Building Trades Employers' Association, 2 Park Ave., New York, N. Y. The papers to be presented are "Interesting Uses for Rubber Products in Industry" by Carl Zieme, technical superintendent, Republic Rubber Co., Youngstown, O.; "Methods of Plasticizing Rubber," Ira Williams and C. C. Smith, research chemists, Jackson Laboratories, E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.

Members of the Society of Rheology are invited to attend this meeting and dinner of the New York Group. Dinner tickets may be obtained at $2 each from W. M. Morse, secretary-treasurer, 420 Lexington Ave., New York, N. Y.

Chicago Group

THE Chicago Group, Rubber Division, A. C. S., will hold a joint meeting with the Chicago Section, A. C. S., Friday, October 25, 1935, at 6.15 p.m., in the Stevens Hotel, Chicago, Ill. Dinner will be served in a private dining room. At 8 o'clock the paper of the evening on a subject of general interest to chemists will be presented by Dr. Norman A. Shepard, director of chemical research, Firestone Tire & Rubber Co., Akron, O. At 9 o'clock the regular group meeting of the Chicago Section will take place.

Members of the Chicago Rubber Group desiring to attend should make reservations with B. W. Lewis, Secretary, in care of Wishnick-Tumpeer, Inc., 365 E. Illinois St., Chicago, Ill.

Latex Chlorinated Rubber

CHLORINATED rubbers soluble in organic solvents can be obtained in a most simple and convenient manner[1] since it is unnecessary to apply any organic solvent either in the oxidation or in the chlorination step of the reaction. The new process is not limited to the oxidation and chlorination of rubber latices as they are obtained by tapping rubber trees. It can likewise be applied to the various latex concentrates of commerce, to purified latices, which have been freed partly or totally from albuminous and resinous compounds, to agglomerated latices, and, finally, to artificial latices obtainable, for example, by polymerizing a butadiene hydrocarbon, such as butadiene or isoprene, in emulsion with water and of an emulsifying agent. Also the artificial latices obtainable by redispersing coagulated rubber in water according to known methods may be subjected to this process with a good result.

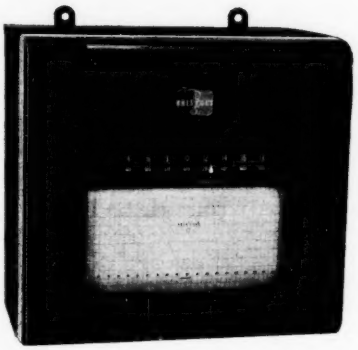
The following is one of several examples illustrating the operation of the process, the parts indicated being by weight. One hundred parts of Hevea latex (conserved by means of ammonia and containing 36% of rubber) are mixed with one hundred parts of a 10% aqueous solution of the sodium salt of dibutylnaphthalene sulphonic acid. Some drops of an aqueous cobalt nitrate solution are added, and air or oxygen is bubbled through the mixture at about 40° C. for about ten days. Chlorine is then introduced into the mixture at room temperature until a chlorinated rubber of about 50% chlorine content is obtained. The mixture is then filtered, and the residue washed and dried. A chlorinated rubber is thus obtained, being easily soluble in organic solvents, for example, tetrahydronaphthalene.

[1] U. S. patent No. 2,005,320, June 18, 1935.

Thiokol D

Thiokol D, an oil-proof synthetic product with rubber-like properties has the following special characteristics claimed for it: tensile strength up to 1,700 pounds per square inch; elongation around 500%; abrasion resistance of the order of rubber very flexible at 45° F. will stand lower temperatures; good resistance to high temperatures, stands hot oil at 200° F.; unique resistance to tear, equal to or better than natural rubber; has excellent resistance to Duco thinner, lacquers, printing inks, benzo-gasoline blends, and most ordinary solvents; good aging qualities; has a mild, not objectionable odor.

New Machines and Appliances



Bristol Potential Pyrometer

Potentiometer Pyrometer

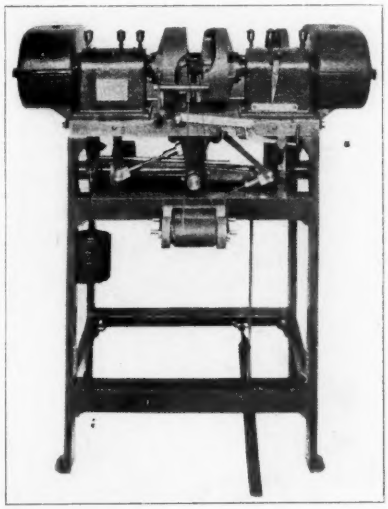
THE wide-strip pyrometer pictured is available in single-record, multiple-record, and recorder-controller types. This instrument, operating on the potentiometer principle of temperature measurement, is outstanding in accuracy, made possible through an almost unbelievably simple measuring, balancing, and recording mechanism. A stainless steel lead screw, operated by an electrical motor under the direction of two galvanometer controlled contacts, adjusts the slide wire contact and recording pen unit to maintain electro-motive-force balance in the potentiometer system. This mechanism introduces an entirely new principle of operation into temperature measurement by means of the potentiometer method. The unique design of the balancing mechanism is such that all mechanical backlash is taken up, making it possible to magnify scarcely perceptible deflections of the galvanometer pointer. No clearance is required between the pointer and the chopper arms. Deflections smaller than 1/1,000-inch are easily measured. The pen movement is always proportional to the size of the galvanometer deflection. This accounts for the quickness with which balance is restored and for the speed with which temperature changes are written on the chart.

The slide wire contact and recording pen are mounted on the same carriage. This particular feature greatly simplifies the mechanical construction of the instrument and completely eliminates errors due to backlash, etc., which are usually associated with gears, linkages, and other types of intervening connections used when slide wire and recording pen are not mounted integrally. The slide wire contact and recording pen carriage run on four wheels over a substantial two-rail track. Three-point contact with the rails insures positive motion. It is driven through engagement with a hardened steel pin by a stainless steel lead screw. The latter, mounted on permanently lubricated ball bearings, is positively driven by an induction-type motor. No friction clutches or ratchet mechanisms are used.

Besides these exceedingly desirable features the instrument records on a 12¼-inch chart with a 1¼-inch indicating scale that can be read easily at a distance; uses a heavy-duty galvanometer totally enclosed in a dust-proof case; has a duplex slide wire mounted in such a position that the slide wire contact and pen are integrally mounted on the same carriage; is housed in a convertible case which is moisture-, fume-, and dust-proof, combining utility, balance, and conservative beauty; and is fully automatic in operation and easy to service in the field by the user. The Bristol Co., Waterbury, Conn.

Improved Flexible Couplings

NEW and important changes in the design and materials of the Francke flexible coupling have been made to meet the changed operating conditions which have occurred in the field of mechanical power transmission within the past few years. All Francke coupling flanges, except the larger sizes, are now made of a forged high manganese alloy steel. The larger sizes are molded of high grade semi-steel. To prolong the life of the moving parts of the coupling self-lubricating, wax impregnated bronze bushings now replace the old-style dry bushings. The new bushings have highly polished bearing surfaces which provide a large contact area. Owing to this self-lubricating feature little resistance is offered to the end-wise movement of the shafts of the connected machines when under load.



Corona Golf Ball Winder

Improved Francke Flexible Coupling

Another important improvement is in the design of the cross pins by which the crucible spring steel laminations are held within the keepers. The center portion of the cross pins which passes through the perforation in the laminations is now made glass hard. By a special process the ends of the cross pins are expanded into the tapered recesses of the keepers, thereby making it impossible for them to become loose. By these and other improvements it is claimed that the Francke is now as trouble-free as is possible to build a flexible coupling. John Waldron Corp., New Brunswick, N. J.

Golf Ball Winder

THE golf ball winding machine pictured winds two threads simultaneously and restarts broken threads without stopping. Any type of center can be wound with the finest thread or threads up to ⅜-inch width. An even distribution is automatically maintained, with no tendencies toward pole to pole windings. Skilled operators are not required. It is impossible to pull a core out of the machine by increasing the tension.

Cores may be wound to any density desired. When wound, the two threads lie side by side, forming a perfect star pattern resulting in a mattress effect to which the cover can be securely anchored. Liquid centers, when frozen, wind perfectly.

Operation is simple and easy. The center is placed in the machine. With power turned on full speed, the ends of the threads are dropped by the operator on to the revolving center. Instantly the threads wind evenly around the center, forming a perfect ball. Should the threads break, the operator

again drops the ends on the revolving core where they attach immediately, and the even winding continues. There is no stopping of the machine to take the core out, or necessity of tying the threads. There is no change in the density of the winding. Corona Mfg. Co., Mt. Airy, Philadelphia, Pa.

Flocontrol Valve

THE Flocontrol valve is a combined valve and control instrument. It is a standard-type globe or angle valve having a micrometer-type dial and pointer which enables the operator to read the valve opening in fractions of turns of the hand-wheel. It is fitted with a four V-port disk which produces proportional flow throughout the full lift of the valve stem. Seats and disks are of heat treated stainless steel and have individual final shutoff seating surfaces. The proportioning is done with one set of surfaces, the final shutoff with another set. Standard long-wearing, coarse stem and bonnet threads are used. Regulation is not dependent on short-wearing fine threads.

The most important feature is that the flow through the valve is always directly proportional to the number of turns of the hand-wheel because of the special slotted seat. Briefly, this means that the user gets straight line control. With the micrometer adjustment the valve can be regulated to within one-tenth of a turn. Every increment of valve opening in tenths of a turn will vary the flow proportionately; that is, if the valve is set at two turns open, then twice as much steam or liquid will pass through it as when it is set at one turn. Hancock Valve Division, Consolidated Ashcroft Hancock Co., Inc.

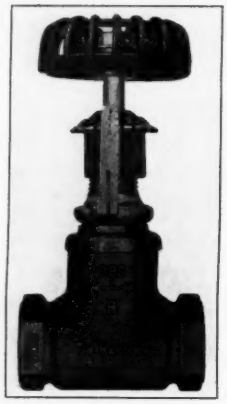
Molding Press

THIS compact 15- to 18-ton capacity air operated platen press for plastics and rubber molding operations provides an advance stroke at six times the speed of the pressing stroke. The advance stroke is 5½ inches at 6,000 pounds' pressure, and the pressing stroke 1½ inches at 30,000 pounds. This cycle of operation permits rapid production, and one operator easily handles the steady production of several presses.

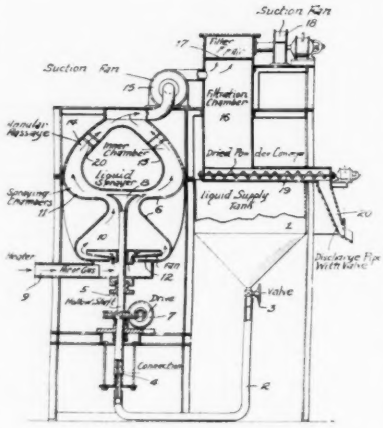
This new press is being used for both hot and cold molding, rubber molding, and several types of special molding operations. Speeds and pressures may be regulated to suit individual requirements of any particular molding work. An especially valuable feature of this press in plastic molding work is the provision for the use of maximum pressure to "break" or separate the molds on the reverse stroke after the pressing operation is completed. An air cushion at the end of the stroke prevents shock.

Since the press is air operated, it is compact and comparatively light in weight. Use of the ordinary shop air supply makes it unnecessary to install hydraulic pumps or special hydraulic power supply for molding work. This feature is particularly important in the establishment of a molding department or the modernization of present facilities at a moderate investment. Production capacity may be accurately suited to requirements, and future expansion provided easily when needed.

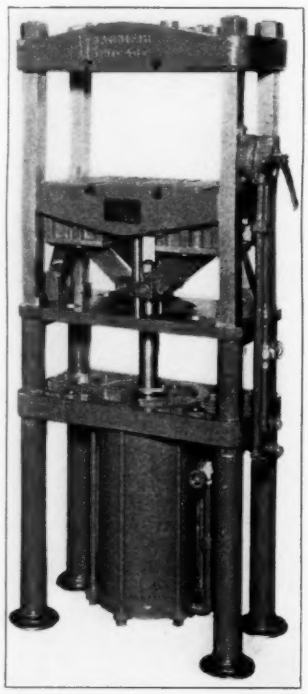
Dimensions of the press are: platen 17 by 14 inches; between columns 22 inches, daylight; platen down 17½ inches, up 10½ inches; advance stroke 5½ inches at 6,000 pounds; power stroke 1½ inches at 30,000 pounds. Advance speed is six times the pressing speed. Cushioned reversal at full power is provided for separating molds upon completion of the molding period. The capacity of 15 tons is with air line pressure of 80 pounds per square inch; 18 tons at 100 pounds per square inch. The same type of press inverted is available for bench mounting. Hannifin Mfg. Co.



Hancock Valve



Apparatus for Producing Powdered Rubber



Air Operated Molding Press

Powdered Rubber

THE sketch represents an apparatus for producing powdered rubber from latex.[1] Its operation follows.

From a supply tank 1 the liquid latex is delivered through a pipe 2 controlled by a valve or cock 3 to a connecting piece 4, which connects the supply pipe to the hollow shaft 5, rotated by any well-known motive power 7, and when rotating, the supplied liquid will be thoroughly sprayed in the funnel-like nozzle or upper part 8 of the hollow shaft, which terminates in a restricted portion of the barrel about midway between its ends.

Heated air or gas is let in through a pipe 9 into the lower part 10 of the barrel 6, the upper part of which forms a spraying chamber 11. In this lower part a fan propeller 12 is provided, secured on the hollow shaft 5. In the upper part of the barrel and within the spraying chamber 11 an inner chamber 13 is provided, connected by lugs 20 to the outer one, thus forming an annular passage 14 for leading the air or gas and the sprayed liquid to the top of chamber 11. The bottom of the inner chamber 13 is horizontal and forms a baffle above the nozzle 8.

The fan 12 forces the air or gas upward to the bell-shaped underside of the nozzle 8, and from this point the outer wall of the spraying chamber 11 directs the sprayed liquid outwardly and upwardly through the annular space 14 between the inner and outer chambers to the top of the outer one, thereby carrying off the particles of the sprayed liquid. At the top of the chamber the vapor, air, and powder are sucked by a fan 15 and pressed into a chamber 16 provided in the upper part with a filter 17. In this chamber the stream slows down so much that the powder, now dried by the heated stream of air, is separated from the liquid and drops down; while the air and vapor may be removed at the highest point through the filter by a motor-driven fan 18. The dried powder falls upon a conveyer 19 mounted at the bottom of the chamber 16 and thus may be conveyed to a valve-controlled outlet pipe 20 in order to be removed from the apparatus.

[1] U. S. patent No. 2,002,252, May 21, 1935.

Rubber Industry in America

OHIO

BUSINESS in Ohio, as throughout the rest of the nation, seems to be on the upswing. Tire manufacturing in Akron improved considerably within the past fortnight; such has also been the case with rubber automobile accessories, which had been dormant for some time. This "boom," of course, is due to the automobile industry's decision to introduce its new models this fall instead of late winter as heretofore. Production in mechanicals continues at the level maintained during the summer, which was better than usual.

The B. F. Goodrich Co., Akron, September 12 started a suit in the Supreme Court, New York County, N. Y., for a declaratory judgment declaring that the consent of at least 75% of each class of its outstanding stock had been properly given in connection with its proposed new mortgage. The officers of the company authorized the following statement.

"At the recent meeting of the stockholders of the company more than 75% of both the common and preferred stock authorized the execution of a new mortgage with an authorized maximum amount of $45,000,000, of which it was proposed to issue approximately $28,000,000 at this time. At the meeting, however, Otis & Co. challenged certain of the proxies which had been received from the stockholders. In order to eliminate any possible doubt which may have been raised by this challenge, the present suit has been instituted, in which Otis & Co. and others are made defendants. An effort will be made to have the case brought to trial at the earliest possible date."

The Premier Rubber Mfg. Co., Dayton, does not manufacture any stock parts for itself, but makes all items special to the customer's specification and design. Premier products are sold from coast to coast and beyond the borders of the United States. The company, which specializes in mechanical and hard rubber goods, maintains, besides its modern factory, a chemical control laboratory and an engineering department. Premier welcomes people who have original ideas on new uses of rubber and will assist in converting them to practical use. At present the firm has over 250 employes. Branch offices are located at 2-265 General Motors Bldg., Detroit, Mich., and 201 N. Wells St., Chicago, Ill. Jos. F. Westendorf is Premier president; Harry H. Gerstner, vice president; and John Westendorf, treasurer and general manager.

J. L. Earl

Mohawk Rubber Co., Akron, through President Charles Borland has announced the appointment of J. L. Earl as vice president and general manager. Since last August he had been in charge of Mohawk tire sales to oil firm distributers. He began his successful career as tire salesman when he joined the Philadelphia office of the Goodyear Tire & Rubber Co. in 1928. In August, 1929, Mr. Earl became a special representative of the executive sales manager of the Lee Tire & Rubber Co., Conshohocken, Pa., where his outstanding work won him the credit of being the major factor in pioneering and developing the sale of company-brand tires through major oil-company service stations. Mr. Earl was the first to introduce the "one fair price policy for both consumer and dealer" and also sponsored the liberal consumer guarantee against all road hazards by a rubber company. Another important accomplishment of his is his invention of the Viso-Meter, an instrument which measures the road contact of competitive tires with the road.

The Firestone Tire & Rubber Co., Akron, on August 3 celebrated its thirty-fifth birthday. Harvey S. Firestone, Sr., its founder and now chairman of the board, on August 2, in honor of the occasion was presented with a basket of thirty-five roses by a committee representing the four hundred employes of the recently organized Twenty-Year Service Club.

John W. Thomas, Firestone president, recently completed a six-week tour of Great Britain and the Continent. This trip included an inspection of Firestone tire factories in England, Spain, and Switzerland and visits to leading dealers and agencies in those countries as well as in Holland, France, and Belgium. Mr. Thomas saw the large, recently completed addition to the plant at Brentford, England, the second expansion necessary to the original unit built in 1928, to handle ever-increasing business. Firestone's head also spent several days at the company's newest tire plant near Basle, Switzerland, which was completed this summer and now is in production. Then Mr. Thomas went to the plant at Bilboa, Spain, attended a meeting of the board of directors, and inspected the concern's newly finished wheel and rim plant now in operation.

The Firestone company has terminated its affiliation with The Rubber Manufacturers Association, Inc., 444 Madison Ave., New York, N. Y. Firestone was not a member of the association even prior to the NRA, during the life of which the rubber company had merely cooperated with the RMA. With the scrapping of the codes Firestone severed this connection.

The Surety Rubber Co., manufacturer of rubber gloves and safety equipment and utilities, Carrollton, is installing a new boiler plant with the latest type of stokers, new compressors, and a new water system, at an approximate cost of $10,000. President S. S. Hall further revealed that his company finds business on the upturn, with the firm's business so far this year considerably increased as compared with the same date in 1934.

Valvoline Oil Co., Fifth and Butler Sts., Cincinnati, which has specialized in the manufacture of lubricants, both automotive and industrial, since its beginning in 1866, has started a naphtha expansion program. Bruce C. Dodd, of Bruce C. Dodd & Co., has been retained as a consultant in the development of this program. The main office at Cincinnati is headed by C. J. Leroux, vice president and general manager; while the refinery and sales office, at Butler, Pa., are under the supervision of C. W. Luton, vice president, division of refineries and pipe lines.

The Federal Housing Administration's "flying squadron" from Washington, D. C., is being assisted in Akron by a committee of nine local business leaders in its FHA "mortgage clinic" started last month. Among those on the committee are F. A. Seiberling, president, Seiberling Tire & Rubber Co., chairman; Fred W. Climer, personnel manager, Goodyear Tire & Rubber Co.; S. M. Jett, secretary, The B. F. Goodrich Co.; and

(*Continued on page* 55)

NEW JERSEY

NEW JERSEY rubber manufacturers are elated over present conditions, and production at this time assures a good fall trade. Some plants operate twenty-four hours a day; while in a few instances production is held fair. During the past few weeks orders for mechanical goods have jumped, and the shoe, heel, and sole industry is also reported good.

Jos. Stokes Rubber Co., Trenton, continues on a 24-hour-day schedule, and expects a busy fall and winter season. Milton H. Martindell, vice president and treasurer, visited the Canadian plant at Welland, Ont., where he found operations normal.

Mercer Rubber Co., Hamilton Square, finds business conditions continuing good.

Near Para Rubber Co., Trenton, reports orders more plentiful, with all employes working.

Essex Rubber Co., Trenton, after a satisfactory summer looks forward to a good fall business. The company's heel and sole production is rising.

The New Jersey Rubber Co. plant, Lambertville, will be sold at public auction this month. For many years the plant had been successful in reclaiming rubber, but has been closed for some time because of the low price of crude. Another factory owned by the firm near Boston likewise has been sold. The Lambertville plant one time employed one hundred men and represented the investment of several hundred thousand dollars. The principal owners are Mr. and Mrs. George A. Clapp, Eugene H. and John S. Clapp, of Boston. Charles M. Dilts, of Lambertville, was plant superintendent many years.

The Pocono Co., Trenton, is running at full capacity in filling new fall orders. Secretary-Treasurer Holland B. Slusser recently returned from a trip along the Pacific Coast.

The Manhattan Rubber Mfg. Division of Raybestos-Manhattan, Inc., Passaic, in commenting upon what was reported the "World's Largest Dredge Discharge Hose" in our September issue, page 54, announces that in 1932 it made a suction hose measuring 33 inches in diameter and has also made a suction hose as large as 48 inches in diameter.

Thiokol Corp., Yardville, reports that business showed a substantial increase over last year's figure and that several new products were turned out the past summer. The company has a fairly good foreign trade.

Dr. J. C. Patrick, Thiokol director of research, sailed from New York, N. Y., September 18. His immediate object was to attend a meeting of the Faraday Society at Cambridge University, September 26 to 28, where he presented a paper on "Polymerization of Dichloride of Ether with Sulphur." He plans to return October 16.

Thiokol C-103

Thiokol C-103 is a synthetic rubber-like coating material with the following properties. It dries by evaporation from a quick drying non-flammable solvent giving a tough and extremely elastic film with an elastic limit of 400% and retains its flexibility to –40° F. It bonds solidly to most surfaces, is stable to action of sunlight, oxygen, ozone, and ultra-violet light, and withstands well natural aging. It is exceedingly impervious to permanent gases, being more than 20 times more resistant to hydrogen, helium, and air permeation than the best rubber compound.

It is insoluble in all petroleum hydrocarbons, unaffected by most alcohols, ketones, and esters and highly resistant to aromatic hydrocarbons and chlorinated solvents, and resistant to dilute solutions of acids and alkaline and oxidizing agents. It is not affected by carbonate solutions, but does not stand concentrated alkalies or concentrated sulphuric or nitric acids.

Thiokol C-103 can be brushed, sprayed, dipped, and spread to protect rubber against grease, oxidation, sunchecking, and solvents. It will not protect against corrosion of metals under water.

Puritan Rubber Co., Trenton, manufacturer of rubber tiling, operating with a full force, expects a good fall output.

Pierce-Roberts Rubber Co., Trenton, is very busy and has enough orders on hand to keep a full crew working several weeks.

The Dewey & Almy Chemical Co., Cambridge, Mass., recently concluded negotiations by which Raybestos-Manhattan, Inc., Passaic, N. J., took over the manufacturing equipment, trade marks, good will, etc., of The Multibestos Co., also of Cambridge. The sale, however, does not include the replacement inventory. Details of the future plan of operation have been presented to all Multibestos distributers.

Acme Rubber Mfg. Co., Trenton. Business is gaining over last year's figure. Prospects for the early winter are good.

Automotive Service Industries Show will be held in the Atlantic City Auditorium, December 9 to 13, under the auspices of Motor & Equipment Wholesalers, National Standard Parts, and Motor & Equipment Manufacturers associations. A. B. Coffman, show manager, Merchandise Mart, Chicago, Ill., reported the display space was practically sold out almost a month before the space drawing. Among the scheduled exhibitors are the Mansfield Tire & Rubber Co., Mansfield, O.; Firestone Tire & Rubber Co., Akron, O.; Dayton Rubber Mfg. Co., Dayton, O.; and Norwalk Tire & Rubber Co., Norwalk, Conn.

MIDWEST

THE decision of the automobile industry to exhibit its new models this fall instead of early in 1936 has changed production figures for the worse as compared with corresponding periods of other years. While schedules show declines for September and October, production is expected to reach high levels in November and December, when the output of new models is in full swing. This year is expected to be the best experienced by the industry since 1929.

In the St. Louis district recently a gradual improvement was noted in all kinds of business. There is a decided quickening in industries, and several large firms are making extensive plant additions.

In the rubber industry conditions remain unchanged. The market is good; demands are brisk, and prices easy. The future looks about as good as hoped for.

Society of Automotive Engineers will hold a meeting October 10, 11, and 12, 1935, at the Palmer House, Chicago, Ill. J. E. Hale, development engineer, Firestone Tire & Rubber Co., Akron, O., will present a paper, "A Truck Tire Overloaded," at the morning session October 10. Other sessions will be concerned with motor truck, tractor, and industrial truck, and metallurgical subjects and discussions.

Van Cleef Bros., makers of "Dutch Brand" rubber and chemical products, Chicago, Ill. Over three hundred employes and their families recently held their annual picnic at Thornton Forest Preserves, Chicago, featured by games, races, and original stunts. Noah Van Cleef, as usual, took motion pictures of the day's events to be included in an extensive file of films covering employe activities. Paul Van Cleef, who has been abroad visiting the company's European representatives, is expected home about October 17.

Whitehead Bros. Rubber Co., Trenton, well occupied in all departments, has all employes working. The shoe division is also experiencing a busy season.

The Thermoid Co., Trenton, being very busy, expects to run with three shifts for some time to come. The Woven Steel Hose & Rubber Co., a subsidiary, also is operating to capacity.

Cycle Trades of America at its twenty-eighth annual convention last month at Hotel Chelsea, Atlantic City, was informed by Manager L. M. Southmayd that bicycle sales so far this year are reaching the highest total since 1910. There are estimated three million riders in the United States, with 1935 sales to date fifty thousand wheels ahead of all sold in 1934.

EASTERN AND SOUTHERN

THE improvement in business activity, begun in early summer, has continued through September. The volume of chemicals moving to the rubber industry continues fairly constant, with no appreciable increase over the past few months. One manufacturer reported that beginning with January, 1935, his sales were slightly higher than in the preceding January, and for each month to date sales have been slightly above those of the corresponding month of 1934. His customers are very optimistic over the future, but as far as he can see, this feeling seems based on hope rather than on anything that is very tangible.

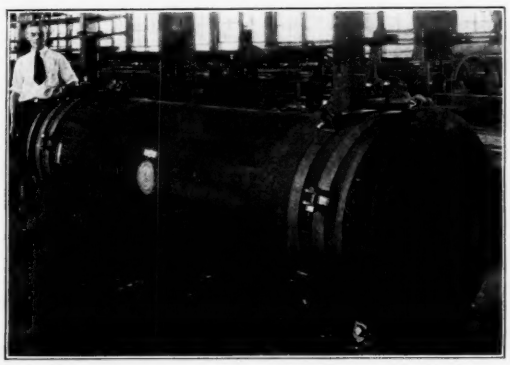
In the East demand for floor covering and apparel is stimulating activity at textile, shoe, and hat factories; while the renovation of houses is arousing good demand for paints and roofing materials and swelling the demand for labor.

The best buying of the year recently developed in the cotton goods market. Prices are advancing, and shortages threatening on some lines.

Machine tool orders rose slightly less than the usual seasonal amount during August, but were more than three times greater than a year ago.

In the South improvement is noted in building, textiles, and coal output. In August in the Richmond district mills consumed 4% more cotton than in August, 1934, and 8% more than in July. This condition was contrary to the national trend. Another encouraging note, in the Atlanta district, is the increase in factory payrolls.

Stockwell Rubber Co., Inc., 535 Arch St., Philadelphia, Pa., recently had made for it by the Boston Woven Hose & Rubber Co., Cambridge, Mass., a length of suction hose believed one of the largest ever made in this country. It is 30 inches inside diameter, 11 feet 7 inches long, and weighs 4,035 pounds. Another length of this hose is 22 inches inside diameter, 10 feet long, and weighs 2,522 pounds. This "Dredge Suction Hose" will be used on a Delaware Bay job.



30-Inch I. D. Section of a "Dredge Suction Hose," One of the Largest Ever Made in America — Manufactured by Boston Woven Hose & Rubber Co. for Stockwell Rubber Co., Inc.

Federal Trade Commission

After a formal complaint has been tried, the Federal Trade Commission, Washington, D. C., considers all the facts in the case and decides whether to order the respondent to cease and desist from the practices charged or dismiss the complaint. Orders to cease and desist were made public in eleven cases in August. Those affecting the rubber industry follow.

Combination in Restraint of Trade

2,354. Rubber Manufacturers Association, Inc., New York, N. Y., and others, engaged in the manufacture of fire hose and chemical hose, directed to discontinue fixing uniform prices at which the products shall be sold by members of respondent association and resold by customers of members.

2,382. Birmingham Automotive Jobbers Association, Birmingham, and others, engaged in the sale of automobile accessories, directed to discontinue fixing uniform prices at which the products shall be sold by members of respondent association or resold by customers of members.

Representation of Retail Prices as Wholesale Prices

2,365. Armstrong Rubber Co., Inc., West Haven, Conn., engaged in the sale of automobile tires and tubes, directed to discontinue quoting retail prices as manufacturer's wholesale prices, and to discontinue misrepresenting the number of plies of fabric in tires.

E. I. du Pont de Nemours & Co., Inc., Wilmington, Del., has appointed John L. Landy advertising manager of the R. & H. chemicals department to succeed the late John A. Lyter.

The United States Treasury Department, Procurement Division, Washington, D. C., submitted September 12, 1935, a proposed federal specification for surgical adhesive plaster, issued for comment and criticism by manufacturers. All communications of this sort must be received not later than October 10 to receive attention of the technical committee considering the specifications.

The Parker Studio

Col. A. F. Townsend

Col. A. F. Townsend, chairman of the board, Raybestos-Manhattan, Inc., Passaic, N. J., on September 10 sailed for London, England, to attend a meeting on September 24 of the International Rubber Regulation Committee. He is the American delegate of the advisory committee. Colonel Townsend feels quite optimistic on the outcome of his company's business for 1935.

The Continental Machinery Co., Inc., 277 Broadway, New York, N. Y., manufacturer of all kinds of rubber making machinery and specialists in latex working equipment, just established the Continental Machinery Co., Ltd., Toronto, Ont., Canada, with adequate facilities for manufacturing rubber machinery to serve the rubber industry in Canada. A resident Toronto representative is established in the Toronto office, which is at 139 Winnett Ave.

The Rubber Manufacturers Association, Inc., 444 Madison Ave., New York, N. Y., is denying reports that its existence will end. Manufacturers hold that the statistical work done by the association for the rubber industry is essential.

Fernando Freije, representative of Binney & Smith Co. in Spain, sailed from New York, September 25, returning to his home in Madrid after having spent three weeks in the United States and Canada on a combined business and pleasure trip.

F. R. Davis, president, Davis Emergency Equipment Co., Inc., 55 Van Dam St., New York, N. Y., producer and distributer of its own designs of gas masks, inhalators, and other industrial safety devices and appliances, is spending about a month on the West Coast with the western division, Davis Emergency Equipment Co., Ltd., San Francisco, Calif. Mr. Davis will return to New York about October 15.

A. P. Bogaevsky, engineer, Autostroy Plant, Gaz, U.S.S.R., recently arrived in New York to arrange for all types of machinery to equip a plant in Russia for the production of rubber automobile accessories. Mr. Bogaevsky will have headquarters at the Amtorg Trading Corp., 261 Fifth Ave., New York, N. Y., during his several weeks' visit here.

Wishnick-Tumpeer, Inc., 295 Madison Ave., New York, N. Y., has added two new members to its extensive staff, Thomas F. Callahan and Clifford L. Heaslip. The former in 1932 was employed by the Palmer Gas Products Corp. under Dr. H. A. Winklemann, where he remained until May, 1935, as head chemist in charge of field operations at Borger, Tex. One of Mr. Callahan's duties was the development of a microscopic technique for the examination of carbon black dispersions. He also made extensive studies in the pyrolysis of gaseous hydrocarbons and in the application of finely divided solids in plastic and liquid vehicles.

Mr. Heaslip for fourteen years was eastern sales representative, covering the Metropolitan District, New England, and Philadelphia, for Siemon & Elting Corp., dry color manufacturer, Irvington, N. J. Then for four more years he served as manager of the firm's New York office. Mr. Heaslip also will work out of Wishnick-Tumpeer's Madison Ave. headquarters.

Lee Kong Chian, of Singapore, probably the largest individual supplier of raw rubber to the American market, arrived in New York, N. Y., September 24 on the *Normandie*. He is completing a trip around the world which he has taken expressly in order to look into world-wide business conditions. He has come by way of Europe and after several weeks in the United States will return to Singapore via the Pacific. He is accompanied by his young son, Master Sang Ghee. Mr. Lee is almost as potent a factor in the world pineapple market as he is in the rubber market. He is founder and managing director of the famous "Lee Firms:" Lee Rubber Co., Ltd., Lee Pineapple Co., Ltd., and the vast Lee Plantations. This is the first time he has been away from Malaya in twenty-three years.

Annual Safety Congress and Exposition

The twenty-fourth annual safety congress and exposition will be held at Louisville, Ky., October 14 to 18. The five-day program will engage the attention of seven thousand delegates representing all walks of life, all parts of the United States and several foreign countries. The official hotels, the Kentucky, the Brown, and the Seelbach, will probably be taxed to capacity in taking care of the delegates.

More than 360 speakers will be heard during the 120 sessions. Every conceivable phase of accident prevention will be covered. While much attention will be focused on street and highway traffic sessions, emphasis will also be placed on accident prevention in industrial plants of all kinds, in the home, in schools, in the air, and at sea. Separate programs have been arranged for industries in the individual sections, such as Cement, Chemical, Petroleum, Rubber, Textile, Automotive and Machine Shop, etc. There will also be general sessions on Industrial Health, Industrial Nursing, Occupational Diseases, and First Aid.

Many special exhibits are planned, the most important of which will be a huge display of equipment developed in recent years for safeguarding dangerous operations of all kinds.

The officers of the rubber section are: general chairman, H. A. Walker, The Goodyear Tire & Rubber Co., Akron, O.; vice chairman in charge of program, A. M. Dietz, Pennsylvania Rubber Co., Jeannette, Pa.; secretary, J. M. Kerrigan, U. S. Rubber Reclaiming Co., Inc., Buffalo, N. Y. The sessions of this section will be held at the Kentucky Hotel, Tuesday and Wednesday, October 15 and 16. Tuesday's session will begin with a resume of Rubber Section activities by Mr. Walker, followed by "Fifteen Years of Safety in the Rubber Industry," by E. W. Beck, superintendent of safety, United States Rubber Products, Inc., New York, N. Y. Then will follow Round Table Topics (ten-minute talks): "Keeping the Management Sold on Safety," R. W. Morse, director, Compensation and Safety, The Firestone Tire & Rubber Co., Akron; "Maintaining the Safety Interest of the Supervising Force," H. W. MacKay, employment manager, Dunlop Tire & Rubber Corp., Buffalo, N. Y.; "How to Sustain the Safety Interest of the Man on the Job," J. T. Kidney, manager, Employees' Service Division, Goodyear; "Conveyer Hazards," W. L. Schneider, safety engineer, The B. F. Goodrich Co., Akron; "Organizing the Safety Man's Job," J. J. Loge, employment manager, The General Tire & Rubber Co., Akron; "Safety Inspection, Who, When and How," H. W. Low, safety engineer, Miller Rubber Products Co., Inc., Akron; "Preventing Accidents," D. G. Welch, safety engineer, Hewitt Rubber Corp., Buffalo; "Use of Lacquer and Ammonia in the Industry," Dr. J. Newton Shirley, medical adviser, Arrow Mutual Liability Insurance Co., Watertown, Mass.; "Health Hazards and Their Relation to Safety," Dr. W. S. Ash, plant physician, U. S. Rubber Products, Detroit, Mich.

The papers scheduled for the Wednesday session are "Making Safety an Integral Part of Plant Operation," T. E. Pittenger, factory manager, Firestone; "Government Regulations and Their Relation to Safety," C. S. Ching, director of public relations, U. S. Rubber Products, New York.

Commodity Exchange, Inc., 81 Broad St., New York, N. Y. The membership of Walter R. Batsell (deceased) recently was sold to James C. Gilson (for another) at $1,900, an increase of $100 over the last previous sale.

André Lévy, rubber chemist, Société de Matieres Colorantes et Produits Chimiques de Saint Denis, 69 Rue de Miromesnit, Paris, 8th, France, manufacturer of rubber accelerators, antioxidants, colors, etc., is spending several weeks in the United States and Canada. The immediate interest of Mr. Lévy is to arrange for the distribution in France through a subsidiary, Société Commerciale des Produits pour Caoutchouc, of American made rubber ingredients that are not manufactured by Saint Denis. During his stay in America Mr. Lévy will have headquarters with Fulton Dye & Import Co., 11 Park Place, New York, N. Y.

The New York Automobile Show will be held in the Grand Central Palace, 480 Lexington Ave., New York, N. Y., one week beginning November 2 instead of in January as in previous years. This move is in accordance with President Roosevelt's request that automobile shows be held in the fall to help spread production and employment in the industry. This arrangement is also expected to enable dealers to be well supplied with automobiles for the spring season and this eliminates any loss of sales because of inability to make deliveries. Many action and educational exhibits are planned for this year's show, and already all available space has been taken. Alvan Macauley, president of the Automobile Manufacturers Association, thinks this year will be the best for the motor car industry since 1929.

United States Rubber Co., 1790 Broadway, New York, N. Y., through H. N. Hawkes, general sales manager of U. S. Tires, has announced the appointment of E. B. Moore as district manager of tire sales at Indianapolis. Mr. Moore, who was district manager at Omaha, will be succeeded there by H. C. Acken, formerly of the Chicago branch. Mr. Hawkes also stated R. W. Collings, formerly district manager of tire sales at Pittsburgh, has been named manager of the sales promotion department. He is succeeded in Pittsburgh by John A. Boll, formerly assistant district manager of the New York branch.

More U. S. Tires in Brazil

United States tire companies obtained 56% of the total Brazilian tire business at the end of June against 54% at the end of June, 1934. Tire sales prospects in Brazil for the balance of 1935 appear very encouraging, with heavy demand for truck tires expected from cotton growers.

U. S. tire distributers look forward to ratification of the reciprocal trade agreement as a stimulus to sales of U. S. tires.

A Brazilian company completed a factory expected to produce automobile tires under the supervision of American technicians starting in September. Initial production will be approximately 200 automobile tires daily.

FINANCIAL

Anaconda Copper Mining Co.

Anaconda Copper Mining Co., 25 Broadway, New York, N. Y., and subsidiaries report for the six months ended June 30 preliminary consolidated net income of $5,214,882, after interest, depreciation, and federal taxes, but before depletion of metal mines, equivalent to 60¢ a capital share, against $2,986,497, or 34¢ a capital share, in the first half of 1934, an increase of 74%. For the quarter ended June 30 net income was $2,864,161, or 33¢ a share, against $2,350,721, or 27¢ a share, in the previous quarter, and $1,350,029, or 15¢ a share, in the June quarter of 1934.

E. I. du Pont de Nemours & Co., Inc.

E. I. du Pont de Nemours & Co., Inc., Wilmington, Del., recently declared an extra dividend of 35¢ a share on the common stock and increased the regular quarterly dividend to 90¢ from the previous rate of 65¢. Both dividends were payable September 14 to stockholders of record August 28. The company also declared the regular quarterly dividend of 1½% on its debenture stock, payable October 25 to stockholders of record October 10.

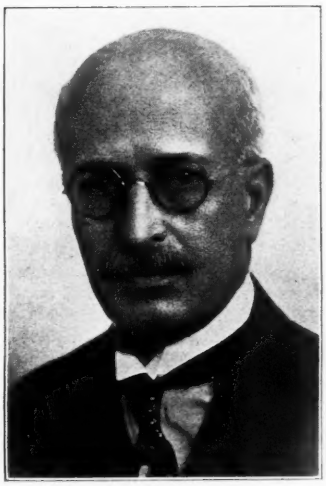
Goodyear Tire & Rubber Co.

The Goodyear Tire & Rubber Co., Akron, O., and subsidiaries earned in the half year a net profit of $2,404,778 after depreciation, interest, federal taxes, subsidiary dividends, and other charges, equivalent to $3.19 a share on 752,854 no-par shares of $7 cumulative first preferred stock. In the same period last year the net profit was $2,617,197, or $3.44 a share, on 759,720 shares of the first preferred stock.

The premium on the recapitalization of the Goodyear Tire & Rubber Co. of Canada, New Toronto, Ont., amounting to $606,492 was charged to surplus in the six months ended on June 30, last.

The company is operating four days a week against five previously; the present schedule is expected to remain in effect some time. This is a little less than the usual seasonal reduction coming at this time of year.

OBITUARY



Henry P. Rand

Henry P. Rand

TRAPPED in a fire that all but destroyed his summer home at Stony Creek, Conn., Henry P. Rand, chairman of the board, Rand Rubber Co., Sumner Ave. and Halsey St., Brooklyn, N. Y., was burned to death September 4. Mr. Rand, who had his name changed from Rindskopf in 1919, entered the rubber business in 1880. He was the pioneer in the United States in the manufacture and use of smooth sheet rubber linings for dress shields. Previously these linings had been imported from Europe.

In January, 1914, Mr. Rand organized and became president of the Brooklyn Shield & Rubber Co., an amalgamation of the Brooklyn Shield Co., the Brooklyn Rubber Co., and the business conducted under the name H. P. Rindskopf. In 1926 the firm was merged into the Rand Rubber Co., of which he became the head. Advancing age later compelled his retirement from active business, and he became chairman of the board; while his son LeRoy, who survives him, succeeded to the presidency.

During his lifetime, the deceased, who was born August 31, 1854, in New York, N. Y., where he attended grade school, belonged to the Masons, Adelphia Lodge, B'nai Brith, Brooklyn Chamber of Commerce, Fulton Street Board of Trade, and Pine Orchard Country Club. He was also well-known as a fisherman.

Also left behind are his wife and a grandson.

Franklin L. Meyer

FRANKLIN L. MEYER, instructor of electricity at the Trenton School of Industrial Art and rubber chemist for John A. Roebling's Sons Co. thirty-three years, died August 23 at Custer, S. D., where he had been living since June because of ill health. Four years ago Mr. Meyer resigned as head of the rubber and insulating laboratory at the Roebling plant to accept the art school position.

He was born in Sutton, Neb., sixty years ago and came to Trenton in 1898 a year after graduating as an electrical engineer from the University of Nebraska. The Roebling company had been sending its wire out for insulation, but when demand for the insulated product became heavy, it decided to establish its own facilities. Mr. Meyer was then chosen head of the rubber insulation laboratory; and as colleges had no courses in rubber chemistry thirty years ago, he had to instruct his own assistants.

Mr. Meyer was an active member of the Hamilton Avenue M. E. Church, Trenton, and treasurer of its Sunday School.

He is survived by his widow and a daughter.

Ohio

(*Continued from page* 51)

William O'Neil, president, General Tire & Rubber Co. The Akron committee will aid the federal men in their survey of local financial institutions and their interviews with business men, builders, and labor union executives. The program is expected to put $500,000 in Akron money to work and add 500 men to local payrolls. The rubber city is the second municipality in the nation in which the federal men have campaigned. The first was Toledo, with very satisfactory results.

Dayton Rubber Mfg. Co., Dayton, O., which recently acquired most of the assets of the McClaren Rubber Co., Charlotte, N. C., has leased the building at 1301 W. Morehead St., Charlotte, as a distribution point for its products. The McClaren plant, a short distance away, has been closed.

United Rubberworkers of America. At the Akron convention of the International Labor Unions the organization of the United Rubberworkers of America was effected. An attempt to present a resolution asking the financial support of the A. F. L. was ruled out of order and therefore denied, according to a report of the *Akron Beacon Journal*. This action apparently came about as the result of delegates declining the recommendation of William Green, A. F. L. president, to elect Coleman Claherty, A. F. L. organizer, president of the new rubber workers' organization.

Dividends Declared

Company	Stock	Rate	Payable	Stock of Record
American Hard Rubber Co.	8% Pfd.	$2.00 q.	Oct. 1	Sept. 14
Firestone Tire & Rubber Co.	Com.	$0.10 q.	Oct. 21	Oct. 4
Fisk Rubber Corp.	Pfd.	$1.50 q.	Oct. 1	Sept. 12
General Tire & Rubber Co.	6% Pfd.	$1.50 q.	Sept. 30	Sept. 20
General Tire & Rubber Co. of Canada, Ltd.	6% Pfd.	$1.50 q.	Oct. 1	Sept. 28
Goodyear Tire & Rubber Co. of Canada, Ltd.	Com., New	$0.62	Oct. 1	Sept. 14
Goodyear Tire & Rubber Co. of Canada, Ltd.	Pfd., New	1¼%	Oct. 1	Sept. 14
Norwalk Tire & Rubber Co.	Pfd.	$0.50 q.	Oct. 1	Sept. 20
Rex-Hide Rubber Mfg. Co.	Com.	$0.25 q.	Oct. 15	Sept. 30

NEW ENGLAND

THE rubber industry in New England is not showing the exceptional activity displayed in other parts of the country. Machine and metal plants, however, were busier than they had been for years, with some firms running with three shifts; while woolen and worsted mills have been operating at capacity. The shoe business is seasonably active.

One rubber footwear manufacturer has announced that his business on hand is approximately that of this time a year ago. There is, though, more selectivity in buying, and the greater portion of better-grade styles of shoes are being purchased. The firm, believing general conditions are improving, anticipates increased business.

Eight Rhode Island rubber manufacturers reported to L. Metcalfe Walling, state director of labor, that at the end of July 7,175 persons were on their regular payroll, a gain of 8.2% over June and 10.2% over July, 1934.

Payrolls distributed by banks to workers in Rhode Island manufacturing industries rose 11.7% during August, 1935, over August, 1934, according to the Brown Bureau of Business Research. The amount distributed for the rubber industry was $195,740, an increase of 19.5% over July, but a loss of 8% as compared with August, 1934.

United States Rubber Products, Inc., is making extensive alterations and improvements at its plant, 355 Valley St., Providence, R. I., which will include a 135-foot reenforced concrete extension to a present underground tunnel and the rearrangement of the fourth floor of the factory. The work will involve several thousand dollars.

The annual outing of the company's employes was recently held at Rocky Point, overlooking Narragansett Bay. Field games and sports were staged first, for which suitable prizes were awarded. Then came a swimming meet in which the contestants displayed U. S. Rubber bathing accessories. A shore dinner was served at noon, followed by "Midway" attractions, games, and dancing.

The cable and wire departments of the company's Bristol plant conducted their annual outing and clambake on August 31 at the Fales' Farm, Bristol. An elaborate program of sports and games was run off for a long list of prizes.

Five thousand employes of the company's Naugatuck, Conn., plant held their outing August 24 at Pleasure Beach, Bridgeport, Conn. A diversified program of sports, contests, dancing, etc., enhanced by many attractive prizes, was the order for the day.

Dr. Ernst A. Hauser, eminent European rubber scientist, arrived in New York, September 21, 1935, from Europe to reside permanently in the United States. He has been appointed associate professor of chemical engineering at the Massachusetts Institute of Technology, Cambridge, Mass.

Cambridge Rubber Co., Cambridge, Mass., according to G. H. Bingham, Jr., has purchased and remodeled a plant and is manufacturing footwear at Cambridge Rubber, Ltd., at St. Remi, P. Q., near Montreal. Necessarily, the company is starting in a conservative way in its sales and production efforts in Canada this present season.

Jenkins Bros., valve and rubber goods manufacturer, Bridgeport, Conn., recently purchased there a brick building with over 100,000 square feet of floor space. Vice President Bernard J. Lee, Jr., announced the new acquisition will first be utilized for storage, but eventually will become the rubber fabricating works of the company.

Rhode Island Rubber Club

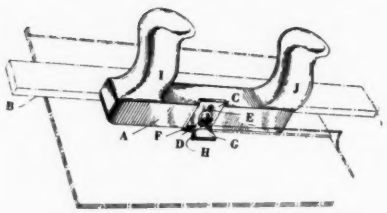
Some sixty or more members and friends of the Rhode Island Rubber Club held a meeting at the Metacomet Golf Club, East Providence, R. I., on September 19. The afternoon was devoted to golf, which was productive of some interesting results, and in the evening there was a steak dinner at the club house.

The speaker at the dinner was A. E. Benson, of the Fisk Tire Co., Inc., Chicopee Falls, Mass. He told in great detail of the engineering problems concerning the building of tires for various types of vehicles and illustrated his talk with charts and sections of tires in process of manufacture.

L. D. Walker, of the Collyer Insulated Wire Corp., presided, and F. E. Rupert, of the Anaconda Wire & Cable Co., watched the financial details.

The golf scores were: low gross for members, F. R. Fitzpatrick, 85; low gross for guests, C. Rounds, 68; low bogey for members, G. W. Smith; for guests, R. Edson; low net for members, J. D. Collins; non-members, C. H. Muehlstein. Attractive prizes donated by members and friends of the club were presented to the winners in the several classes as well as to the runners-up.

In addition to the local members of the trade who attended the dinner there were numerous visitors from New York, Boston, and other points.



Device to Prepare Laminated Fabrics for Splicing

Belt Splicing Tool[1]

THE hand tool pictured is designed for cutting step splices in the plies of rubber belting in order to unite it with a smooth joint of uniform thickness and without injury to the adjoining plies. The tool *A* has a flat bed surface and a guide surface adapted to follow a guide bar *B* laid across the belt to locate the line of the proposed cut. The cutting element *C* is dovetailed into the side body of the tool and adjusted vertically by a clamp screw *D* in a slot *E*. The cutter has a cutting edge at *F* on its leading vertical margin and has a wing *G* extending sidewise from the body of the tool and provided with a dull edge *H* for separating the plies. Handles *I* and *J* are provided for operating the tool.

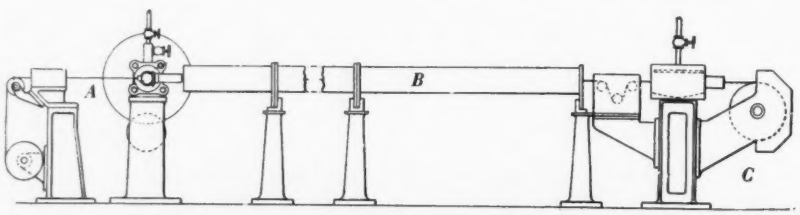
The operation of the device follows. Having determined the line of a desired step, the guide *B* is clamped to the laminated article a distance from the line of cut equal to the width of the body of the tool from the guide face to the cutting edge *F*. The cutter *C* is set to project below the body *A* by a distance equal to the depth of one ply of fabric. The tool is then placed on the laminated fabric against the guide and is propelled along by hand. The edge *F* of the cutter slits the top ply without injury to the underlying plies, and the dull edge *H* lifts a zone of the top ply adjacent the line of cut so as to permit grasping the top ply and separating it from the laminated material.

[1] U. S. patent No. 2,004,517, June 11, 1935.

Continuous Vulcanizer

THE arrangement shown in the diagram[1] represents a method of insulating a wire at *A*, its continuous passage through a tubular steam-jacketed vulcanizer *B*, for curing and final reeling up at *C*.

[1] U. S. patent No. 1,999,751, Apr. 30, 1935.



Means for Continuous Vulcanization of Rubber Goods

Rubber Industry in Europe

GREAT BRITAIN

Expanded Chlorinated Rubber

Results of research work on expanded chlorinated rubber, undertaken on behalf of the Technical Research and Development of New Uses Committee of the Rubber Growers' Association, by P. Schidrowitz and C. A. Redfarn, were recently published in the *Journal of the Society of Chemical Industry* and reprinted in the *Bulletin of the Rubber Growers' Association*. When trials in connection with moldings were carried out in an ordinary plunger or positive mold of the type used in molding synthetic resin compositions, the authors relate, it was found that when the mold temperature was around 320 to 350° F. and the pressure released while the mold was still hot, a product resulted that was light, strong, fibrous, cellular, and many times the size of the mold cavity. Investigation has shown that certain brands of chlorinated rubber expand more readily than others and that the properties of the expanded product vary according to the brand used. However, if certain proportions of liquids as benzene, toluene, xylene, or alcohol are added to the chlorinated rubber powder before expansion, satisfactory results can be obtained from most brands.

The general structure of the expanded material appears to be that of a network of non-communicating cells, with walls showing flow lines. The size of the cells varies according to the degree of expansion. When the expansion is high, the fibrous appearance is quite striking, more so on the outside layers, which most resemble long-fibered asbestos, than on the inner part, which is mica-like. The apparent specific gravity of the material also varies according to the degree and method of expansion and is very low. A feature of the material is its firmness even with high expansion so that even when the apparent specific gravity is as low as 0.087, it can still be sawn.

The product has the further advantages of being non-flammable, odorless, while it can be sawn or cut, as well as extruded and molded to shape. The insulating powers to heat, sound, and electricity have not yet been accurately determined, but it is expected that the material will be commercially valuable here. The very light type of expanded chlorinated rubber (specific gravity 0.087) retains considerable buoyancy in water even when completely waterlogged; it has then absorbed about 50% of its own weight of water, but the apparent specific gravity is still only about 0.13 so that it should prove useful in the construction of aircraft, speed boats, life-saving apparatus, etc.

The cost of the expansion process on a large scale will be low, it is believed. Chlorinated rubber itself, however, is still rather expensive although improved methods of production and increasing demand will probably lead to a substantial reduction in price. It seems that on the Continent certain grades are already marketed at about 10% above the selling price of nitrocellulose.

All Wheels Pneumatic-tired

Whereas some years ago isolated instances of the use of pneumatic tires on hand carts and the like were mentioned as matters of curiosity, today the advantages of these tires are being appreciated more and more, and their use is expanding everywhere. In a recent issue of the *Bulletin of the Rubber Growers' Association* a variety of hand carts and horse-drawn vehicles is shown fitted with pneumatic tires. These include carts for delivering bread and milk, coal carts, tipping containers, spraying machines, water carriers, etc. The city street-cleaning department finds these tires useful for the so-called city orderly bins. A new type of combined harvester and thresher with pneumatic tires is sold by Allis Chalmers Mfg. Co., London, and is said to be the first rubber-tired "combine" to be used in England. A special spraying machine devised primarily for fruit farms and green houses, but which can be adapted for painting by replacing the insecticide sprayer with a paint sprayer, is driven by hand and has two rather large pneumatic-tired wheels. Another spraying machine, suitable for Bordeaux and similar mixtures, is horse-drawn, and the rubber tires give ease of movement.

Interesting experiments have been conducted in Victoria, New South Wales, with pneumatic-tired, one-man power graders for general road work. When high-pressure tires were used, considerable wheel-slip developed. After various trials it was found that low-pressure tires gave greatly improved results, and these are now to be used as standard equipment on two machines. In India and Ceylon attempts are being made to introduce pneumatic tires for bullock carts. Experiments have been conducted to compare the destructive effects of iron tires and pneumatic ones on road surfaces, and the results naturally were all in favor of the latter. Iron-wheeled carts with less than 2/3 the load of rubber-tired carts wore a track down so badly in nineteen days that the experiment had to be abandoned; while the track on which the rubber-tired bullock-carts had traveled was still in excellent condition.

While on the subject, it is worth while mentioning two cases reported from Germany where the introduction of pneumatic tires for horse-drawn vehicles on small farms has made all the difference between bare subsistence for the owners and a certain measure of prosperity. In one case the possibility of carrying greater loads more quickly permitted earlier planting of certain vegetables with resulting increase in output. In the other, a small farmer and his son were enabled to bring their vegetables to market themselves instead of having to pay to have it done; while in addition they could carry loads for others, thus further increasing their earnings.

British Notes

A British private company to manufacture chemical solvents has been formed under the auspices of an American firm, the Commercial Solvents Corp., and a British company, the Barter Trading Corp. A large new factory has been established at Bromborough Port, Cheshire.

The British public is being informed that New York is "Mac-shy." A correspondent of a prominent daily paper, reports the *Bulletin of the Rubber Growers' Association*, refers to the almost entire absence of waterproofs in New York during wet weather. It appears that they simply are not worn even in the heaviest downpour, and it is thought that lack of advertising may be partly responsible.

The Department of Commercial Products of the City of London College is offering a course of eighteen lectures on rubber, to be given on consecutive Tuesday evenings from October 1, 1935, to February 18, 1936. The first twelve lectures, by George Rae, of Harrisons & Crosfield Ltd., deal with "The Production and Consumption of Rubber." The next two, by A. D. Robb, of Hymans, Kraay & Co., take up "The Marketing of Rubber." W. H. Stevens, of Henry P. Stevens & Sons, consulting chemist to the R. G. A., will discuss "The Character Grades and Defects of Raw Rubber" in the concluding four lectures.

Effective August 3, 1935, the United Kingdom has placed an alternative import duty on rubber tubing and piping. Tubing and piping manufactured partly

of rubber (including compounded rubber, vulcanite, and ebonite), balata or gutta percha, with or without nozzles or other attached fittings and not reenforced or armored with metal wire or strip throughout its length, are now dutiable under the general tariff at 1½ pence per pound, or 20% ad valorem, whichever is the greater. The classification, "other manufactures" (of rubber, etc.) wholly or partly of the same material, but not including sheets and machinery belting, remains dutiable at 20% ad valorem under the general tariff. Empire products continue exempt from these duties.

Latex in Racket Strings

Many types of synthetic tennis strings have been on the market for years. The majority are of silk covered with a plasticized gelatine, but such strings cannot compete with natural gut for appearance, resilience, and wear. Even natural gut has its defects, as it is too sensitive to climatic conditions.

The Speedstring, a successful and different string, is the result of much experimental work. Degummed silk was found most suitable for synthetic tennis strings. It has great strength, is lighter than other textile fibers, is very elastic, and, when treated with a mixture or compound of correct refractive index, will produce a translucent final product. Silks vary in strength, luster, and other properties; so particular care is necessary in selecting the type for Speedstrings.

The binding and coating materials of the Speedstring consist of a balanced mixture of latex and other natural products of a colloidal nature. The latex, of which a correct percentage is most important, acts mainly as a waterproofing agent and also as a plasticizer for the other ingredients essential for hardness, wear, and general appearance. The incorporation of most of the usual compounding ingredients has been tried, but these spoil the appearance, producing opaqueness.

The silk is first treated with a solution of the coating material and, while wet, is given the necessary number of twists. The whole is then allowed to dry under a specified tension and is finally given a special heat treatment to vulcanize the latex and at the same time stabilize the other ingredients.

The Speedstring is of excellent appearance, and it is only with difficulty that one can detect a difference between natural gut and Speedstring when in the racket. This tennis string is made by Dunlop Rubber Co., Ltd.

Germany

The Leipzig Fall Fair was not expected to lead to any considerable amount of business; so exhibitors were satisfied with results which might otherwise have been considered meager. Inland business came up to expectations and was good; in many cases it was reported that sales were not below those at the Spring Fair. Foreign orders were disappointing despite the fact that there were an unusually large number of foreign visitors particularly from England, Czechoslovakia, Poland, Jugoslavia, and Scandinavia. Most of the foreign business was done in the better grade of surgical rubber goods and rubber sponges; England was one of the best customers. Colorful, attractively boxed bathroom sets including bath mats, sponges, soap dishes, etc., also found a ready sale. Foam rubber, which is finding extended use for closings for doors and windows, for upholstery, and for insulations for acoustic apparatus, aroused much interest.

The superiority of diamond-edged cutting tools over those of metal edges for finishing goods of hard rubber or artificial resin is discussed by W. Winter in *Werkstatt und Betrieb*. For instance a diamond-edged tool cut grooves 3 mm. deep in more than 3,000 bakelite rings of about 50 mm. diameter before it became dull. Had a hard metal edge been used for the same work, it would have had to be reground so often as to have become quite useless; whereas the diamond, after resetting, could be used again repeatedly for similar amounts of work. Diamonds with an edge of 1.5 mm. have also proved useful in cutting hard rubber disks from tubes. The edge of the diamond was beveled in front to give a clean-cut surface, and the disks required no further finishing. The diamond edge is also valuable in the production of better-grade fountain pens, hard rubber casings, closures that must fit accurately, etc.

Three new products to aid in manufacturing with latex are being marketed by the I. G. Farbenindustrie A. G., Frankfurt a. M. Vultamol is recommended as a dispersing and stabilizing agent. For the former purpose it is used in solution (1.1%); as a stabilizer, 5% calculated on the zinc oxide is suggested. Latekoll is a thickener; while Igepon T is a moistening agent recommended for use in impregnating with latex.

The Continental Uebersee Co. A. G., Hannover, has been renamed Continental Caoutchouc Export A. G. The firm is to engage in the sale of all goods manufactured by the Continental Gummi-Werke A. G., Hannover, and of all those concerns in which the company has an interest; it will undertake all business connected with these sales, acquire and alienate real estate and land, establish branches and acquire interest in concerns producing the same kind of goods. The capital of 990,000 marks has been raised to the figure of 1,000,000 marks.

The premises of the Standard Marienburger Gummiwerke A. G., which failed some time ago, have been acquired by the Gummiwerk Reinhold Gollert K. G., Marienburg. The necessary alterations in the plant will be completed within a few weeks when production of all kinds of rubber goods will be commenced.

European Notes

A fourth synthetic rubber factory is being erected in Kazan, Soviet Russia, to be ready by November. In this latest factory, it is said, the defects of the older ones have been avoided. Consequently it is expected the synthetic rubber industry will have no difficulty in working up to the program which for 1936 demands 40,000 tons of synthetic rubber. The output for 1934 was said to have been 11,300 tons, and for 1935 a total of 20,000 to 25,000 tons is hoped for. Tires made from this rubber are claimed as durable as those of natural rubber, and any disappointing results are held due to defects in the manufacture of the tire and not to the use of synthetic rubber.

The disorganization among labor is preventing the biggest automobile tire factory of the Jaroslawski Rubber & Asbestos combine from filling its spring program. For the last two months of the first quarter of the year production fell short 20,000 tires; while in May only 90,000 tires were produced against 116,500 which were called for in the scheduled plan.

As a result of agitation by local footwear manufacturers, who fear that over-expansion in the rubber footwear industry would lead to increasing unemployment, the activities of Bata in Switzerland are to be limited. Last year the local Bata Schuh A.G. obtained permission to erect new factory buildings. This permission has been revised so that Bata may not equip more than four new work shops to make rubber footwear; not more than 160 additional workers may be hired in these shops; while the annual output of light, rubber-soled canvas shoes may not exceed 300,000 pairs.

During the first half of 1935 Holland imported 2,428 tons of crude rubber against 2,099 tons the year before, but imports of rubber manufactures fell off considerably because of the import restrictions. Thus footwear declined from 885,795 pairs, value 487,000 guilders, to 279,870 pairs, value 199,000 guilders; cycle tires, 411,211, value 243,000 guilders, to 252,767, value 161,000 guilders; inner tubes for cycles, 441,272, value 84,000 guilders, to 252,911, value 53,000 guilders; automobile tires, 131,193, value 2,176,000 guilders, to 119,404, value 1,776,000 guilders; tubes, 95,404, value 231,000 guilders, to 82,964 units, value 169,000 guilders. The chief exports were cycle tires, 152,845, value 100,000 guilders, against 164,340, value 109,000 guilders, and tubes, 92,523, value 22,000 guilders, against 106,635, value 24,000 guilders.

In 1934 the Netherlands rubber industry included seventeen factories employing 2,100 persons and turning out goods valued at 5,500,000 guilders.

The third quota period for the importation of rubber footwear into the Irish Free State, originally covering the last six months of 1935, was shortened to three months, and the quantity to be admitted reduced from 596,500 to 128,000 pairs, under an order dated June 28, 1935.

In Portugal automobile wheels are dutiable at the same rate as tires. Certain mineral oil for manufacturing metal polish and rubber cement is exempt from internal tax.

Rubber Industry in Far East

MALAYA

Restriction Benefits

For three years, 1931, 1932, and 1933, the price of rubber averaged around 3d. per pound; in 1932 it was less than 2½d., and in April to July of that year the price dipped under 2d. Since the announcement of the restriction scheme, the average has been about 6d. The producing countries are beginning to feel the beneficial effects of this upward swing; more estates are again paying dividends, others increasing them; in fact the slump is over. But recovery has not been so rapid and so sensational, perhaps, as many of those who joyfully greeted the advent of restriction expected. The rubber market is still a buyers' market; stocks continue high; the price is practically stationary; speculative interest is sadly lacking; and so the control scheme is being more or less severely criticized.

Under these circumstances the visit of Victor Lowinger, one of the Malayan representatives on the International Rubber Regulation Committee, to Malaya is particularly opportune. He came primarily to discuss tin control, but addressed the Singapore Rotary Club on rubber, and reminded his audience that stocks did not decrease the first year of restriction because of the five months of unrestricted production stimulated by the rise in price in anticipation of the agreement being signed. He further pointed out that "the adverse situation has been piling up since 1929, and you cannot expect it to be put right in a few months." Discussing the 65% quota fixed in July, 1935, Mr. Lowinger said if this rate continued for a year, production would be about 730,000 tons; while careful estimates placed consumption around 950,000 tons, a figure exceeded in 1934, therefore not unduly optimistic. If, therefore, no great change in the world's economics occurred, a reduction of stocks at the rate of 200,000 tons per annum could be looked for during the year started July, 1935. Answering criticism of the price level, he stated simply that 6d. per pound was twice 3d., and even if this price was not quite high enough for the producer, it had at least wrought a tremendous change in the spending power of the population.

One gathers that while Mr. Lowinger looks for, and probably would welcome, a price rise as stocks decrease, he does not favor any sudden jumps in price and that he would be content with a more moderate level than many producers desire. Everyone in the I. R. R. C., he declared, was honestly imbued with a sense of responsibility and a genuine desire to make the scheme a success. Speaking not only for himself but for all the delegates, he paid special tribute to the Dutch delegates and the Government of Netherlands India for the very fine and successful manner in which they had tackled their most difficult task.

Touching on rubber research, he stated that the Committee appointed to study the question of an International Research Board had reported it would be impossible to provide a central research institute domiciled either in England or Holland because of the difficulties of handling funds raised by the two different governments. However a separate British and a Dutch institute could be formed which would collaborate in arranging research work and exchange information and results, the Rubber Growers' Association possibly being represented at the former.

Is a Rubber Shortage in Sight?

Mr. Lowinger's statement that a 65% quota would lead to a reduction in stocks at the rate of 200,000 tons per annum gives added interest to the considerations of R. H. Wright in the *Financial News* regarding the danger of an acute rubber shortage within a few years. Comparing the world absorption of rubber in 1925, 557,847 tons, with the 925,066 tons of 1934, he shows an increase in absorption over the ten years from 1925 to 1934 averaging, 36,721 tons a year. Against this figure are production quotas rising from 1,021,500 tons in 1934 to 1,276,500 tons for 1938, an average annual increase of 51,000 tons over the five-year period. On the face of it there should thus be no fear of a shortage. But the ten years from 1925 to 1934 include the depression. If the absorption of 1932-1934, when world trade recovery set in, is considered, we find an increase at the rate of 80,000 tons a year, and if we compare 1932 with 1934, the increase is 115,678 tons. That is to say, when world trade improves, rubber consumption improves rapidly; it is recovering now; consequently a yearly increase in absorption of 80,000 tons, instead of 36,721 tons, is held the right, even a conservative, estimate.

Again there are those who doubt that, if permitted, producers could put 100% of their basic quotas on the market. But granting they could, even so with an average annual increase of 80,000 tons world absorption will have reached 1,325,000 tons by 1938 against production of 1,276,500 tons in that year, that is there would be a shortage of 48,500 tons. This shortage would increase in the following years, particularly if world trade continued to improve, for how would the extra rubber required be supplied since new planting is prohibited to 1939? Even if large acreages of rubber were planted just before 1934, which would come into bearing in 1940, the shortage is hardly likely to be met, contends Mr. Wright, for Malaya, the largest producing country, has for years stopped planting. A serious shortage of rubber, and consequently a boom is, therefore, to be expected around 1940 unless the International Rubber Regulation Committee permits controlled planting immediately.

One would have thought that by permitting estates to replace a certain part of the old unprofitable rubber with high-grade budded rubber, the I. R. R. C. was in effect allowing some new planting which, if budded areas fulfill their promise, may in the end amount to much more than the bare acreage figures would suggest. On the other hand, it must be admitted that Malaya seems to have had some difficulty in producing her quota. Unused coupons must represent a fairly considerable amount if the government

British Malaya

An official cable from Singapore to the Malayan Information Agency, Malaya House, 57 Charing Cross, London, S.W.1, England, gives the following figures for August, 1935:

Rubber Exports: Ocean shipments from Singapore, Penang, Malacca, and Port Swettenham

	August, 1935	
To	Sheet and Crepe Rubber Tons	Latex, Concentrated Latex, Revertex, and Other Forms of Latex Tons
United Kingdom	11,485	218
United States	26,709	383
Continent of Europe	8,090	192
British possessions	1,500	52
Japan	2,745	27
Other countries	460	12
Totals	50,989	884

Rubber Imports: Actual, by Land and Sea

	August, 1935	
From	Dry Rubber Tons	Wet Rubber (Dry Weight) Tons
Sumatra	1,460	3,199
Dutch Borneo	2,099	669
Java and other Dutch islands	86	...
Sarawak	709	50
British Borneo	308	12
Burma	84	1
Siam	1,491	571
French Indo-China	72	67
Other countries	96	4
Totals	6,405	4,573

thinks it necessary to rule that starting July 1 export permits will be canceled if unused at the end of the current quarter.

Malayan Notes

The average Malayan estate, producing 525 pounds per acre and tapped on the A.B.C. system, Eric Macfadyen is quoted as stating, makes net profits of £3 5s. per acre when rubber is at 6d. a pound, and breaks even at 4½d. But a modern budgrafted estate, giving three times the yield, under the same conditions, clears a profit of £21 10s. per acre when the price is around 6d., and even when the price is 4½d., it can still show earnings of £11 15s. an acre.

The three new chemists joining the technical staff of the Rubber Research Institute of Malaya are J. H. Piddlesden, chemical engineer, K. C. Roberts, formerly senior lecturer at King's College, Cambridge, and R. A. Hamilton, soils chemist from Trinidad.

Exactly what the slump has meant to the sixty-seven rubber companies in Malaya is apparent from figures quoted by the *Straits Times* planting correspondent. In 1926 all but two of the sixty-seven companies paid a dividend; twenty-three turned out from 50 to 100%, and only five paid less than 14%. But in 1931 many booked losses, and only five declared a dividend, the highest being Kedah Rubber Co., with 5%. Matters were still worse in 1932, with only three companies paying dividends, Kedah again leading, this time with 2½%. An improvement took place in 1933 when thirteen companies declared dividends, the highest representing 7½%, turned out by a company that had paid nothing in the two preceding years. The definite upturn in rubber in 1934 is reflected in the dividends turned out by forty-six companies.

Netherlands India

Following the extraordinarily heavy shipments of native rubber in May, 1935, which reached the record figure of 22,433,258 kilos, these exports declined in June to 14,576,493 kilos and in July to 7,866,740 kilos. Estate exports from Java and Madura during May came to 6,654,420 kilos, in June, 5,794,538 kilos, and in July, 5,971,958 kilos. The estate shipments from the Outer Provinces in May totaled 7,743,326 kilos, in June, 9,437,904 kilos, in July, 7,110,629 kilos.

While the condition of various rubber companies operating in Netherlands India has improved of late, it is still far from rose-colored. A firm in the Hague shows that fifty concerns, regularly quoted on the rubber exchange in Holland, together represent a nominal value of 109,674,300 guilders; while the real value in June, 1935, was 80,346,000 guilders. Dividends declared during 1934 totaled 242,730 guilders, 0.22% on the nominal amount. So far in 1935, 607,870 guilders have been announced in dividends; it is expected that this amount will increase to 800,000 to 1,000,000 guilders by the end of the year, which still would leave the return on the nominal value at under 1%. At the end of 1933 twenty-two of the fifty companies reported total indebtedness of 6,884,500 guilders after deducting cash and liquid assets. At present eleven concerns owe in debentures 5,829,000 guilders; while twenty-eight concerns, after deducting debts, show total net liquid assets of 13,520,000 guilders. Neither the Allied Sumatra nor companies in liquidation figure in these calculations.

The local society devoted to propaganda for new uses for rubber plans to test a mixture of rubber and other ingredients as a surface material for tennis courts. If sufficient funds become available this year, a tennis court behind the Buitenzorg Club will be coated with this compound by way of experiment.

As compared with March, there was an increase of 1,000 hectares in the area of estates out of tapping April, 1935. The tappable area represents 85.6% of the total planted to rubber, and 19.8% of the tappable area was untapped in April against 19.6% in March. Young tappable trees never yet tapped decreased from 58,267 hectares in March to 56,796 in April.

Aside from the Goodyear tire factory, opened June 7, there are two manufacturers of miscellaneous rubber goods in East Java. The Goodyear plant expects to use about 875 tons of rubber a year at full production (300 tires and tubes daily). The other factories would probably use much less. Local consumption is thus of little significance compared with domestic production or exports.

Indo-China

The Institut des Recherches Agronomique of Indo-China is starting an experimental garden where descendants of Hevea, obtained by artificial pollination, will be studied with a view, on the one hand, of finding outstanding trees to serve as stock for clones superior to those known at present, and, on the other, of finding good clones which by crossing will give high-grade strains capable of being used as planting material.

The experiment was to have been carried out on territory of the Experiment Station of Giaray, but lack of funds prevented this. Fortunately several large rubber companies which are closely following the work at Giaray have offered to establish experimental gardens on their own land at their own expense. The land selected for the present experiment belongs to the Société des Plantations d'Anloc (Bienhoa) and covers an area of about 14 hectares (hectare equals about 2.45 acres). Fifty-five combinations belonging to twelve families will be used. Part of the material has been supplied by the Ste. des Plantations des Terres-Rouges. Most of the clones to be tested are the older tried Dutch clones, but certain local clones have also been included.

Indo-China's crude rubber exports totaled 19,873,832 kilos in 1934. For the first four months of 1935 the figure was 9,002,161 kilos.

Japan

In connection with the complaints of Japanese dumping the well-known French periodical *L'illustration* devotes considerable space to reproductions of a variety of articles of Japanese manufacture now appearing on the French market. These include different rubber goods, and the retail prices at which they are sold in France are given. A hard rubber comb is priced at 0.45 francs; with the par value of a franc now 6.63 American cents, this comes to about 3¢ here; rubber-soled tennis shoes sell for 3.50 francs a pair, or 23¢; rubber-soled walking shoes, for 9 francs, or almost 60¢; rubber boots, 45 cm. high (about 18 inches) for men, are 7.25 francs, or 48¢. By comparison with this, bathing caps at 0.85 francs, or 5½¢, are expensive. Water bottles are only 1.20 francs, or about 8¢. Another of the more expensive items is a thermometer in an ebonite case complete with holder, which sells for 3.50 francs, or 23¢.

Small wonder that countries are doing all in their power to exclude Japanese goods. Incidentally, the exports of Japanese rubber toys fell rather sharply during 1934, when they represented a value of 6,406,000 yen against 8,633,000 yen in 1933; in 1932 the total was 5,507,000 yen and in 1931 only 2,198,000 yen.

It is rumored that the Toyo Chisso Kogyo K.K. of Yokohama (the Oriental Nitrogen Industry) plans manufacturing synthetic rubber. The basic material is to be calcium carbide.

Japanese exports of rubber products the first half of 1935 were valued at 24,370,611 yen, 8% more than for the corresponding period in 1934, but 9% less than for the 1933 months. Exports of rubber boots and shoes comprise 53% of total exports of rubber goods, and they registered a trade gain of 8% in the current six months as compared with the 1934 period. Other increases occurred in rubber tires and inner tubes, 13%, and in other rubber products such as mechanical goods and specialties, 85%. Japanese exports of rubber toys declined in total value in the three six-month periods under discussion—from 4,431,144 yen in 1933 to 3,807,971 yen in 1934 and to 2,076,883 yen in 1935. Lower unit values, it is believed, to meet growing world competition in the rubber toy trade, were partly responsible for the lower total value of this trade.

India

In our August issue mention was made of the new Travancore state rubber factory at Trivandrum. Now rumor has it that India is to have still another and much larger rubber factory at Bombay. According to current reports this factory is to be built by a European concern which has a capital of 5,000,000 rupees. A variety of rubber goods, including tires, sheets, tubes, etc., is to be produced, and it is expected in time the firm will supply practically all the rubber goods India needs.

Patents and Trade Marks

MACHINERY

United States

19,660 (Reissue). **Continuous Article Vulcanizer.** T. M. Knowland, Belmont, assignor to Boston Woven Hose & Rubber Co., Cambridge, both in Mass.

2,008,127. **Thread Apparatus.** J. E. C. Bongrand, Paris, and L. S. M. Lejeune, Wasquehal, both in France.

2,008,306. **Tumbling Article Protector.** C. L. Jones, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.

2,008,618. **Thread Regulator and Indicator.** A. J. Lefebvre, Lowell, Mass.

2,008,801. **Tennis Shoe Cementer.** E. W. Stacey, Beverly, Mass., assignor to United Shoe Machinery Corp., Paterson, N. J.

2,009,338. **Tire Tool.** O. C. Brown, Cuba, O.

2,009,486. **Cementer.** F. C. Eastman, Marblehead, Mass., assignor to United Shoe Machinery Corp., Paterson, N. J.

2,009,524. **Used Tire Facer, Stitcher, and Retreader.** G. A. Schmidt, Walnut Park, Calif.

2,009,531. **Rubber Latex Spray Drier.** M. J. Stam, The Hague, Netherlands.

2,009.549. **Valve Stem to Inner Tube Vulcanizer.** W. A. Gwynn, St. Louis, Mo.

2,009,643. **Tread Rubber to Tire Applier.** H. J. Woock, assignor to Super Mold Corp., both of Lodi, Calif.

2,010,049. **Tire Tester.** A. O. Abbott, Jr., Grosse Pointe Park, and C. M. Sloman, Detroit, both in Mich., assignors, by mesne assignments, to United States Rubber Co., New York, N. Y.

2,010,061. **Hose Apparatus.** N. H. Curtiss, Passaic, N. J., assignor, by mesne assignments, to United States Rubber Co., New York, N. Y.

2,010,104. **Rubber Article Apparatus.** C. R. Peaker, Passaic, N. J., and E. Hazell, New York, N. Y., assignors, by mesne assignments, to United States Rubber Co., New York, N. Y.

2,010,122. **Festooner.** G. F. Wikle, Detroit, Mich., assignor, by mesne assignments, to United States Rubber Co., New York, N. Y.

2,010,861. **Casing Vulcanizer.** H. V. James, Kanarado, Kan.

2,010,878. **Rubber Thread Collector.** E. A. Murphy and W. G. Gorham, assignors to Dunlop Rubber Co., Ltd., all of Birmingham, England.

Dominion of Canada

351,578. **Insulated Conductor Apparatus.** Western Electric Co., Inc., New York, N. Y., assignee of A. R. Kemp, Westwood, N. J., and A. N. Gray, Baltimore, Md., co-inventors, all in the U. S. A.

351,585. **Golf Ball Filler.** L. A. Young Co., assignee of J. M. Oldham, both of Detroit, Mich., U. S. A.

351,698. **Rubber Thread Apparatus.** International Latex Processes, Ltd., St. Peter's Port, Channel Islands, assignee of J. R. Gammeter, Akron, O., U. S. A.

351,966. **Vulcanizer.** Boston Woven Hose & Rubber Co., Cambridge, assignee of J. M. Bierer, Newton, both in Mass., U. S. A.

352,200. **Tire Builder.** Goodyear Tire & Rubber Co., Akron, assignee of M. Lammertse, Akron, C. E. Gardner, Cuyahoga Falls, and W. C. State, deceased, in his lifetime of Akron, co-inventors, all in O., U. S. A.

352,236. **Indicator Movement.** Charles J. Tagliabue Mfg. Co., Brooklyn, assignee of L. C. Irwin, Garden City, both in N. Y., U. S. A.

352,243. **Article Treater.** Wingfoot Corp., Wilmington, Del., assignee of R. B. Day, Akron, O., both in the U. S. A.

352,295. **Rubber Thread Apparatus.** American Anode, Inc., Akron, assignee of C. L. Beal, Cuyahoga Falls, both in O., U. S. A.

352,352. **Inner Tube Apparatus.** General Tire & Rubber Co., Akron, O., U. S. A., assignee of A. S. Knowlton, Mexico, D. F., Mex.

352,390. **Coater.** United Shoe Machinery Co. of Canada, Ltd., Montreal, P. Q., assignee of J. B. Hadaway, Swampscott, Mass., U. S. A.

352,392. **Sole Treater.** United Shoe Machinery Co. of Canada, Ltd., Montreal, P. Q., assignee of C. G. Brostrom, Lynn, Mass., U. S. A.

352,393. **Cementer.** United Shoe Machinery Co. of Canada, Ltd., Montreal, P. Q., assignee of T. Lund, Beverly, Mass., U. S. A.

United Kingdom

426,748. **Tire Groover.** G. M. Hutcheson, London.

426,842. **Tire Groover.** C. F. Boyer and G. W. Fouke, both of St. Louis, Mo., U. S. A.

426,901. **Tire Vulcanizing Mold.** W. J. Woodcock and John Bull Rubber Co., Ltd., both of Leicester.

426,947. **Tire Vulcanizing Mold.** Dunlop Rubber Co., Ltd., London, and H. Willshaw, T. Norcross, and F. G. Broadbent, all of Birmingham.

427,123. **Tire Building Drum.** D. Bridge & Co., Ltd., Castleton. (National Rubber Machinery Co., Akron, O., U. S. A.)

427,143. **Tire Tread Groover.** Tecalemit Soc. Anon., Paris, France.

427,284. **Retread Vulcanizer.** H. Simon, Ltd., Cheadle Heath.

427,299. **Tire Repair Vulcanizer.** J. Boch, Vienna, Austria.

427,315. **Tube Measurer and Cutter.** Dunlop Rubber Co., Ltd., London, and H. Willshaw, H. Smith, and G. H. B. Yoxon, all of Birmingham.

427,563. **Watchcase Vulcanizer.** D. Bridge & Co., Ltd., Castleton. (National Rubber Machinery Co., Akron, O., U. S. A.)

427,914. **Vulcanizing Mold.** J. Grabec and A. Ledofsky, both of Bratislava, Czechoslovakia.

427,930. **Web Guider.** R. Canfori and G. Beltrame, both of Schio, Italy.

428,174. **Plasticity Tester.** M. J. E. Chopin, Paris, France.

428,206. **Thickness Gage.** Firestone Tyre & Rubber Co., Ltd., Brentford, assignee of R. W. Brown.

428,292. **Length Indication Printer.** India Rubber, Gutta Percha & Telegraph Works Co., Ltd., and H. Leared, both of London.

Germany

617,332. **Mold.** Anode Rubber Co., Ltd., St. Peter's Port, Channel Islands. Represented by C. and E. Wiegand, both of Berlin.

618,398. **Comb Cutter.** C. Tober, Berlin-Karlshorst.

PROCESS

United States

2,008,028. **Hard Rubber Coating.** W. J. McCortney, Royal Oak, and E. L. Bailey, Birmingham, assignors to Chrysler Corp., Detroit, all in Mich.

2,008,242. **Porous Ebonite Diaphragm.** S. J. Clark, assignor to Young Accumulator Co. (1929), Ltd., both of New Malden, England.

2,008,772. **Oscillating Joint.** I. W. Robertson, assignor to Firestone Tire & Rubber Co., both of Akron, O.

2,009,331. **Raised Printing Form.** E. Uher and S. Fränkel, both of Augsburg, Germany; said Uher assignor to Externa S. A., Lausanne, Switzerland.

2,009,463. **Fuel Briquette.** R. E. Windecker, Painesville, O.

2,009,599. **Applying Tread Rubber to Tires.** H. J. Woock, assignor to Super Mold Corp., both of Lodi, Calif.

2,009,848. **Suction Roll.** G. R. Keltie, assignor to American Wringer Co., Inc., both of Woonsocket, R. I.

2,010,168. **Shoe.** A. Q. Williams, Weymouth, Mass.

2,010,767. **Pneumatic Tire.** H. F. Maranville, assignor to General Tire & Rubber Co., both of Akron, O.

2,010,827. **Insole Strips.** E. J. Ray, Beverly, Mass., assignor to United Shoe Machinery Corp., Paterson, N. J.

2,010,856. **Boot and Shoe.** A. Goldberg, Paterson, N. J.

2,011,071. **Shoe.** V. H. Moss, Brookline, Mass.

2,011,180. **Rotating Shaft Collar.** H. O. Lindgren, Appelviken, Sweden, assignor to De Laval Separator Co., New York, N. Y.

Dominion of Canada

351,589. **Tire.** J. G. Smith, assignee of A. H. Shoemaker, both of Seattle, Wash., U. S. A.

351,684. **Spot Cap.** Crown Cork & Seal Co., Inc., Baltimore, Md., U. S. A., assignee of A. Leenaards, Antwerp, Belgium.

351,729 and 351,730. **Reconstructed Leather.** International Latex Pro-

cesses, Ltd., St. Peter's Port, Channel Islands, and Societa Anomina Prodotti Salpa & Affini S.A.P.S.A., Milan, Italy, assignee of G. Severini, Milan, Italy.

351,828. **Adherent Sheeting.** Dunlop Plantations, Ltd., London, assignee of N. R. Corke, Birmingham, both in England.

351,958. **Boot and Shoe.** F. W. Farr, Northampton, England.

351,990. **Golf Ball.** Dunlop Tire & Rubber Goods Co., Ltd., Toronto, Ont., assignee of D. F. Twiss, F. A. Jones, and E. W. Allen, co-inventors, all of Birmingham, England.

352,010. **Belt Splice.** B. F. Goodrich Co., New York, N. Y., assignee of F. G. Skeyhan, Akron, O., both in the U. S. A.

352,131. **Boot and Shoe.** H. Rollmann, Koln-Marienburg, Germany.

352,250. **Fabric and Rubber Product.** I. and L. Dorogi, co-inventors, and Magyar Ruggyantaarugyar Reszvenytarsasag, assignee of ½ interest, all of Budapest, Hungary.

352,401. **Diaphragm.** S. J. Clark, inventor, and Young Accumulator Co. (1929), Ltd., assignee of ½ interest, both of New Malden, England.

352,414. **Ventilated Fabric.** Hood Rubber Co., Inc., Wilmington, Del., assignee of A. A. Glidden, Watertown, and V. H. Bodle, Newton, both in Mass., all in the U. S. A.

United Kingdom

426,829. **Molding Concrete Conduits.** H. E. Lindas, Wichita, Kan., U. S. A.

426,874. **Condenser.** Telegraph Condenser Co., Ltd., London, and F. C. Stephan, Purley.

426,988. **Flexible Sheet Material.** R. F. McKay, Birmingham. (International Latex Processes, Ltd., St. Peter's Port, Channel Islands.)

427,060. **Ball.** K. Lehner, Vienna, Austria.

427,515. **Battery Box.** Soc. Des Accumulateurs Electriques (Anciens Etablissements A. Dinin), Seine, France.

427,807. **Porous Ebonite.** S. J. Clark and Young Accumulator Co. (1929), Ltd., both of New Malden.

427,815. **Cellular Chlorinated Rubber.** T. N. Montgomery and J. A. M. W. Mitchell, both of Runcorn, and Imperial Chemical Industries, Ltd., London.

428,137. **Grooving Tires.** R. Sommer, Berlin, Germany.

428,211. **Compound Fabric.** J. Morton, Carlisle.

428,220. **Elastic Fabric.** F. R. Raven and H. A. Raynor, both of Nottingham.

428,275. **Embossing.** Turner & Newall, Ltd., Rochdale.

Germany

617,201. **Method and Device for Making Thread.** Revere Rubber Co., Providence, R. I., U. S. A. Represented by C. and E. Wiegand, both of Berlin.

617,202. **Making Square Rubber Thread.** E. Vincke, Palamos, Catalonia, Spain. Represented by J. Fritze, Hamburg.

617,281. **Rubber Bands from Vulcanized Tubes.** Kolnische Gummifaden-Fabrik vormals Ferd. Kohlstadt & Co., Koln-Deutz.

618,180. **Impregnating Fabric.** International Latex Processes, Ltd., St. Peter's Port, Channel Islands. Represented by R. and M. M. Wirth, C. Weihe, all of Frankfurt a.M., and T. R. Koehnhorn, Berlin.

618,181. **Hard Rubber Dust.** International Latex Processes, Ltd., St. Peter's Port, Channel Islands. Represented by C. and E. Wiegand, both of Berlin.

618,342. **Coloring Rubber.** I. G. Farbenindustrie A. G., Frankfurt a.M.

618,343. **Rubber-like Molded Articles.** Allgemeine Elektricitats-Gesellschaft, Berlin.

CHEMICAL

United States

19,654 (Reissue). **Age Resister.** M. C. Reed, Lakewood, O., assignor to B. F. Goodrich Co., New York, N. Y.

19,664 (Reissue). **Carbon Black.** E. H. Damon, assignor, by mesne assignments, to Cabot Carbon Co., both of Pampa, Tex.

2,007,958. **Rubber-like Material.** L. Aúer, Budapest, Hungary, assignor to J. R. Newman, Washington, D. C., as trustee.

2,008,102. **Rubber Plasticizer.** J. Hyman, assignor to Velsicol Corp., both of Chicago, Ill.

2,008,170. **Rubber Essence.** R. Botson and J. Kamp, both of Auderghem, Belgium.

2,008,489. **Gas-Generating Composition.** W. R. Cousins, Norwich, England, assignor to Imperial Chemical Industries, Ltd., a corporation of Great Britain.

2,008,554. **Rubber Compounding.** R. J. and E. C. King, assignors to Robert J. King Co., Inc., all of Stamford, Conn.

2,008,558. **Chlorinated Rubber Dispersions.** W. Laufenberg and R. Schwarz, both of Berlin-Tempelhof, assignors to Chemische Fabrik Buckau, Ammendorf, all in Germany.

2,008,861. **Vulcanizable Compound.** A. N. Gray, Baltimore, Md., and A. R. Kemp, Westwood, N. J., assignors to Bell Telephone Laboratories, Inc., New York, N. Y.

2,009,028. **Plastic Material Composition.** R. L. Sibley, Nitro, W. Va., assignor to Rubber Service Laboratories Co., Akron, O.

2,009,435. **Noncaking Pigment.** C. Coolidge and H. S. Holt, assignors to E. I. du Pont de Nemours & Co., all of Wilmington, Del.

2,009,480. **Antioxidant.** D. Craig, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.

2,009,526. **Antioxidant.** W. L. Semon, Silver Lake Village, O., assignor to B. F. Goodrich Co., New York, N. Y.

2,009,530. **Antioxidant.** A. W. Sloan, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.

2,009,712. **Rubber Composition.** P. K. Frolich, Roselle, N. J., assignor to Standard Oil Development Co.

2,009,776, 2,009,777, and 2,009,778. **Coating Material.** A. L. Kronquest and S. C. Robison, both of Syracuse, assignors to Continental Can Co., Inc., New York, all in N. Y.

2,010,000. **Accelerator.** M. W. Harman, Nitro, W. Va., assignor to Rubber Service Laboratories Co., Akron, O.

2,010,059. **Accelerator.** C. Coleman, Passaic, N. J., assignor, by mesne assignments, to United States Rubber Co., New York, N. Y.

2,010,871. **Fibrous Composition.** E. W. Madge and F. J. Payne, both of Birmingham, assignors to Dunlop Rubber Co., Ltd., London, all in England.

2,011,218. **Fabric Cement.** L. V. Glomb, Jamaica, assignor to Britex Awning Cloth Co., Inc., Richmond Hill, both in N. Y.

2,011,219. **Accelerator.** M. W. Harman, Nitro, W. Va., assignor to Rubber Service Laboratories Co., Akron, O.

2,011,496. **Antislip Rubber Material.** J. O. Luchinger, assignor to Azo Aktiegesellschaft, both of Biel, Switzerland.

Dominion of Canada

351,474. **Cork Substitute.** V. G. Walsh, Stanmore Park, England.

351,699. **Latex Composition.** International Latex Processes, Ltd., St. Peter's Port, Channel Islands, assignee of C. E. Linscott, Ridgewood, N. J., U. S. A.

351,700. **Latex Thickening.** International Latex Processes, Ltd., St. Peter's Port, Channel Islands, assignee of J. McGavack, Leonia, N. J., U. S. A.

351,745. **Rubber Composition.** T. and S. Arnold, co-inventors, both of Bradford, England.

351,757. **Rubber Product.** L. Gaisman, Woodley, England.

351,842. **Age Resister.** B. F. Goodrich Co., New York, N. Y., assignee of W. L. Semon, Silver Lake, O., both in the U. S. A.

351,961. **Rubber Compounding Material.** Barrett Co., New York, N. Y., assignee of A. B. Cowdery, Needham, Mass., both in the U. S. A.

352,183. **Moistureproofing Composition.** du Pont Cellophane Co., Inc., Wilmington, Del., assignee of A. Hershberger, Kenmore, N. Y., both in the U. S. A.

United Kingdom

427,228. **Latex Coating Composition.** International Latex Processes, Ltd., St. Peter's Port, Channel Islands.

427,491. **Wound Dressing.** E. Sander, Munich, Germany.

427,495. **Age Resister.** E. I. du Pont de Nemours & Co., Wilmington, Del., U. S. A.

427,562. **Latex Compounding.** U. Pestalozza and Soc. Italiana Pirelli, both of Milan, Italy.

427,653. **Latex Coating Composition.** Minnesota Mining & Mfg. Co., St. Paul, Minn., U. S. A.

427,700 and 427,702. **Coating Composition.** Minnesota Mining & Mfg. Co., St. Paul, Minn., U. S. A.

427,724. **Coating Surface.** British Celanese, Ltd., and W. H. Moss, both of London.

427,804. **Chlorinating Rubber.** A. Carpmael, London. (I. G. Farbenindustrie A. G., Frankfurt a. M., Germany.)

427,817. **Age Resister.** I. G. Farbenindustrie A. G., Frankfurt a. M., Germany.

427,870. **Adhesive.** J. Knaggs, Whitchurch, and Pirie, Appleton & Co., Ltd., London.

427,903. **Accelerator.** J. Y. Johnson, London. (I. G. Farbenindustrie A. G., Frankfurt a. M., Germany.)

427,977. **Rubber Dye.** I. G. Farbenindustrie A. G., Frankfurt a. M., Germany.

428,410. **Hydrocarbon Condensation Product.** Standard Oil Development Co., Linden, N. J., U. S. A.

428,456. **Chlorinated Rubber Composition.** British Celanese, Ltd., London.

Germany

617,318. **Vulcanizing Rubber.** United States Rubber Co., New York, N. Y., U. S. A. Represented by C. and E. Wiegand, both of Berlin.

617,897. **Treating Balata, Gutta Percha, or Rubber Resins.** Dunlop Rubber Co., Ltd., London, England. Represented by C. and E. Wiegand, Berlin.

GENERAL

United States

19,649 (Reissue). **Toy Nursing Bottle.** M. Wittmann, New York, N. Y.

19,657 (Reissue). **Doll.** C. E. Bowers, Washington, D. C.

2,007,982. **Undergarment.** O. E. Rohn, Truro, N. S., Canada.

2,007,999. **Hose Suspension.** W. E. Brown, Fairfield, Conn., assignor to E. I. du Pont de Nemours & Co., Wilmington, Del.

2,008,062. **Slide Fastener.** G. H. C. Corner, Birmingham, England, assignor to Hookless Fastener Co., a corporation of Pa.

2,008,067. **Vacuum Cleaner.** E. Faber, Stuttgart, Germany.

2,008,070. **Pen and Pencil Flashlight.** A. Godman, Minneapolis, Minn.

2,008,085. **Seam Taper.** P. L. O'Donnell, Norwood, O.

2,008,096. **Valve Stem.** J. H. Clo, Baldwin, assignor to A. Schrader's Son, Inc., Brooklyn, both in N. Y.

2,008,101. **Valve Washer.** G. W. Haury, Chicago, Ill.

2,008,118. **Garment.** F. E. Waterman, Jr., Fairhaven, assignor to Neatease Co., New Bedford, both in Mass.

2,008,158. **Cushion.** W. C. Van Dresser, assignor to Van Dresser Specialty Corp., both of Detroit, Mich.

2,008,197. **Filling Carrier Friction Device.** C. A. Anderson, Putnam, Conn., assignor to Guaranteed Parts, Inc., Allston, Mass.

2,008,204. **Filling Carrier Friction Device.** S. O. Dodge, Medford, assignor to Guaranteed Parts, Inc., Allston, both in Mass.

2,008,209. **Chair Iron.** W. F. Herold, assignor to Bassick Co., both of Bridgeport, Conn.

2,008,221. **Squeegee.** A. Molander, St. Paul, Minn.

2,008,325. **Refrigerator.** W. C. Holbrook, Dayton, O., assignor, by mesne assignments, to General Motors Corp.

2,008,331. **Pie Edge Trimmer.** S. Meisner, Columbus, O.

2,008,353. **Transmission Belt.** R. E. S. Geare, assignor to L. H. Gilmer Co., both of Philadelphia, Pa.

2,008,363. **Aquarium Air Supply.** J. B. Maris, Glen Ridge, N. J.

2,008,438. **Typewriter Platen.** C. T. Dickey, Elizabeth, assignor to Rodic Rubber Corp., Garwood, both in N. J.

2,008,455. **Tire Pressure Control.** G. H. Krieger, Mason City, Iowa.

2,008,534. **Tubing.** S. Wiltse, Detroit, Mich.

2,008,552. **Inflatable Article Attaching Means.** J. Jacobs, assignor to Oak Rubber Co., both of Ravenna, O.

2,008,595. **Toy Gun.** M. A. Reed, Ft. Wayne, assignor to Kitchen Maid Corp., Andrews, both in Ind.

2,008,622. **Tire Pressure Indicator.** J. McClure, assignor of 55% to N. P. Wood, both of Poteau, Okla.

2,008,650. **Hose Coupling.** A. J. Weatherhead, Jr., assignor to Weatherhead Co., both of Cleveland, O.

2,008,677. **Breathing Mask.** L. Y. Booharin, assignor of 1/3 to B. Werner and 1/3 to F. Muller, all of San Francisco, Calif.

2,008,697. **Shoe.** G. Goddu, deceased, by I. W. Goddu, executrix, both of Winchester, assignor to Littleway Process Co., Boston, all in Mass.

2,008,741. **Closure Seal.** J. R. Allan, Oak Park, Ill.

2,008,756. **Joining Cable Units.** R. E. Green, Detroit, Mich.

2,008,777. **Molded Insulation Article.** W. C. Tregoning, Wauwatosa, assignor to Cutler-Hammer, Inc., Milwaukee, both in Wis.

2,008,818. **Float Shoe.** E. B. Corbett, Houston, assignor to C. S. Crickmer, Dallas, both in Tex.

2,008,872. **Buttonhole Stitcher Drive Pulley.** G. Minkowitz, New York, N. Y.

2,008,875. **Prophylactic Article Container.** T. H. Peterson, Oakland, and E. V. Sweeney, Berkeley, both in Calif.

2,008,925. **Spring Shackle.** G. E. Parker, Birmingham, assignor to General Motors Corp., Detroit, both in Mich.

2,008,942. **Paint Applicator.** O. M. Beall, Des Moines, Iowa.

2,008,944. **Golfer's Club Swing Perfecter.** R. W. Carmichael, Los Angeles, Calif.

2,008,954. **Tractor Lug.** H. Griebat, Lodi, Calif.

2,008,981. **Resilient Wheel.** T. H. Henkle, Detroit, Mich.

2,008,985. **Inner Sole.** E. Lattemann, Waldfischbach, Germany.

2,008,990. **Bathers' Wiper and Massager.** T. P. Mullen, Bayside, N. Y.

2,009,004. **Insulated Electric Conductor.** R. A. Schatzel, Rome, assignor to General Cable Corp., New York, both in N. Y.

2,009,040. **Punching Bag Apparatus.** F. H. Beach, New York, N. Y.

2,009,057. **Internal Combustion Engine.** L. M. Woolson, assignor to Packard Motor Car Co., both of Detroit, Mich.

2,009,059. **Railway Device.** W. P. Brennan, Newton, and T. F. Dwyer, Jr., Cambridge, assignors to Fabreeka Products Co., Inc., Boston, all in Mass.

2,009,073. **Respirator Bag.** H. F. Shindel, assignor to Willson Products, Inc., both of Reading, Pa.

2,009,075. **Expansible Tubing.** H. E. Thompson, Providence, R. I., assignor to Anaconda Wire & Cable Co., New York, N. Y.

2,009,125. **Electrical Energy Intensifier.** S. Smithson, Rutherford, N. J.

2,009,142. **Refrigerating Display Case.** J. E. Marsh, Jr., High Point, N. C.

2,009,204. **Running Board.** H. M. Pryale, Pontiac, Mich.

2,009,214. **Gaseous Electric Discharge Device.** K. Wiegand, Berlin-neu-Tempelhof, Germany, assignor to General Electric Co., a corporation of N. Y.

2,009,221. **Gaseous Electric Discharge Device.** J. Bruijnes, P. Schouwstra, and B. van Engel, all of Eindhoven, Netherlands, assignors to General Electric Co., a corporation of N. Y.

2,009,237. **Football.** A. McGall, Orange, N. J.

2,009,256. **Game.** T. Gensmer, Portland, Ore.

2,009,309. **Railway and Tramway Track.** B. S. Davies, Horsell Rise, and P. A. Summers, Osterley, both in England.

2,009,310. **Diaper.** H. E. Dendoff, Vancouver, B. C., Canada.

2,009,336. **Wearing Apparel.** V. F. Barbaro, San Francisco, Calif.

2,009,349. **Railway Vehicle Tire.** J. P. Tarbox, assignor to Edward G. Budd Mfg. Co., both of Philadelphia, Pa.

2,009,353. **Railway Vehicle Tire.** E. G. Budd, assignor to Edward G. Budd Mfg. Co., both of Philadelphia, Pa.

2,009,355. **Halitosis Detector.** G. C. Decker, Binghamton, N. Y.

2,009,356. **Aircraft Anchor.** A. P. de Seversky, New York, assignor to Seversky Aircraft Corp., Farmingdale, both in N. Y.

2,009,360. **Pen Stand.** H. L. Koch, assignor of ½ to T. Kramer, both of Milwaukee, Wis.

2,009,361. **Knitted Fabric.** J. Lawson, Bristol Highlands, assignor to Lawson Knitting Co., Central Falls, both in R. I.

2,009,377. **Wiper.** D. C. Abdelnour, Port Chester, assignor to D. A. & H. Corp., New York, both in N. Y.

2,009,398. **Drain Flusher.** J. C. Green, Detroit, Mich.

2,009,399. **Milking Machine.** C. H. Hapgood, Nutley, N. J., assignor to De Laval Separator Co., New York, N. Y.

2,009,423. **Packing.** H. T. Wheeler, assignor to E. Wheeler, both of Dallas, Tex.

2,009,445. **Wall Structure.** A. A. Gould, Cleveland, O.

2,009,540. **Fishhook.** J. L. Applegate, Woodriver, Ill.

2,009,546. **Lobster-Claw Retainer.** P. L. Fannen and A. J. Cappello, both of Gloucester, Mass.

2,009,551. **Swimming Apparatus.** R. Huebner, Brooklyn, N. Y.

2,009,588. **Windshield Wiper.** C. U. Parker, Jackson, Miss.

2,009,595. **Antislipping Tread Unit.** E. Van der Pyl, Holden, assignor to Norton Co., Worcester, both in Mass.

2,009,598. **Saw Tooth.** D. E. Webster, assignor to Norton Co., both of Worcester, Mass.

2,009,614. **Antisqueak Body Bracket.** H. D. Geyer, Dayton, O., assignor, by mesne assignments, to General Motors Corp., Detroit, Mich.

2,009,650. **Pipe Joint.** A. W. Claussen and H. G. Floyd, assignors to McWane Cast Iron Pipe Co., all of Birmingham, Ala.

2,009,698. **Game.** L. Marx, New York, N. Y.

2,009,721. **Vacuum Cup Luggage Carrier.** P. Q. Williams, Ottawa Hills, O.

2,009,731. **Brassiere.** M. De W. French, Warren, R. I.

2,009,744. **Pipe Line Repairer.** G. H. Pfefferle, assignor to S. R. Dresser Mfg. Co., both of Bradford, Pa.

2,009,749. **Shock Absorber.** L. Simon and R. Marcon, assignors, by direct and mesne assignments, to Societe d'Exploitation des Brevets Lucien Simon (Amortisseurs Sanchok) Societe Anonyme, all of Paris, France.

2,009,759. **Toy Shuttlecock.** J. A. Brown, Camden, O.

2,009,773. **Applicator.** J. T. Heflin, Lafayette, Ala.

2,009,789. **Arch Support.** C. Saladino, Middle Village, L. I., N. Y.

2,009,801, 2,009,802, and 2,009,803. **Refrigeration.** R. L. Hallock, Larchmont, N. Y.

2,009,825. **Aseptic Catheter-Handler.** R. H. Wappler, Yonkers, N. Y.; F. C. Wappler executor of said R. H. Wappler, deceased.

2,009,858. **Toy.** H. F. Riopelle, Ecorse, Mich.

2,009,866. **Molded Rubber Article.** P.

E. Young, Fairhaven, Mass., assignor to I. B. Kleinert Rubber Co., New York, N. Y.

2,009,885. **Connecter.** F. J. Hardman, Dayton, O., assignor, by mesne assignments, to General Motors Corp., Detroit, Mich.

2,009,891. **Combination Garment.** S. D. Kops, assignor to Kops Brothers, Inc., both of New York, N. Y.

2,009,990. **Undergarment.** L. Levenson, Flushing, N. Y., and S. L. Berger, Newton Center, Mass.

2,010,040. **Temperature Indicator.** W. Shurtleff, assignor to Herman Nelson Corp., both of Moline, Ill.

2,010,062. **Tire Inflater.** C. W. Dawson, Dayton, O.

2,010,093. **Hat and Garment Supporter.** P. L. Lazarus, St. Louis, Mo.

2,010,103. **Eraser.** H. W. Maucher, W. Orange, N. J., assignor to Eberhard Faber Pencil Co., a corporation of N. Y.

2,010,114. **Fountain Pen.** H. I. Schwartz and J. H. Rothstein, both of New York, N. Y.

2,010,163. **Back Protector.** C. L. Spiess, Philadelphia, Pa.

2,010,241. **Brassiere.** B. H. Norman, assignor to R. & W. H. Symington & Co., Ltd., both of Market Harborough, England.

2,010,250. **Tire Air Pressure Maintainer.** A. Appelgate, assignor of ½ to S. A. Freet, both of Toledo, Iowa.

2,010,258. **Nursing Nipple Applicator.** W. D. Forbes, San Francisco, Calif.

2,010,260. **Tire and Rim Assembly.** Q. A. Gladden, Cincinnati, O.

2,010,343. **Fabric Fastener.** H. V. Barclay, Corona, N. Y.

2,010,345. **Garment.** H. Brewster, Long Beach, N. Y.

2,010,368. **Automobile.** J. V. Martin, Garden City, N. Y.

2,010,371. **Float.** A. Perri, McKees Rocks, Pa.

2,010,391. **Hopper Car.** O. C. Duryea, Waterbury, Conn., assignor to O. C. Duryea Corp., Wilmington, Del.

2,010,398. **Liquid Switch.** A. W. Keen, Passaic, N. J., assignor, by mesne assignments, to United States Rubber Co., New York, N. Y.

2,010,457. **Thermal Douche.** H. M. Kanner, Sacramento, Calif.

2,010,474. **Abrading Pad.** K. H. Bowen, assignor to Columbian Rope Co., both of Auburn, N. Y.

2,010,475. **Fiber Article Producer.** K. H. Bowen, assignor to Columbian Rope Co., both of Auburn, N. Y.

2,010,498. **Envelope Separator.** E. W. Smith, assignor to Electric Storage Battery Co., both of Philadelphia, Pa.

2,010,575. **Bung Driver.** J. White, New York, N. Y.

2,010,585. **Surgical Belt.** E. C. Duff, assignor to Kops Brothers, Inc., both of New York, N. Y.

2,010,612. **Elastic Body Belt.** J. W. Stafford, Chicago, Ill.

2,010,617. **Wheel Mounting.** L. Willeme, Nanterre, assignor to Société pour l'Exploitation de Brevets de Roues Automobiles (Sebra), Paris, both in France.

2,010,623. **Shock Absorber.** E. Bugatti, Molsheim, France.

2,010,625. **Bodywork.** M. J. Daste, Courbevoie, France.

2,010,637. **Nipple.** Y. H. Kurkjian, Paterson, N. J.

2,010,668. **Rail Vehicle Tire.** C. F. Hirshfeld, Detroit, Mich., assignor to T. Conway, Jr., and C. Gordon, co-trustees for Electric Railway Presidents' Conference Committee.

2,010,693. **Windshield Cleaner Mounting.** H. Hueber, Buffalo, and E. C. Horton, Hamburg, assignors to Trico Products Corp., Buffalo, all in N. Y.

2,010,734. **Dish Rack.** C. C. Parker, Buffalo, N. Y.

2,010,749. **Arch and Ankle Support.** J. J. Cartledge, Guelph, assignor of ½ to H. S. Jones, London, both in Ont., Canada.

2,010,758. **Electrolytic Condenser Insulation.** W. H. Grimditch, Glenside, assignor to Philadelphia Storage Battery Co., Philadelphia, both in Pa.

2,010,787. **Lockstitch Knit Fabric.** W. Mendel, Beverly, and J. Titone, Burlington, assignors to Neidich Cel-Lus-Tra Corp., Burlington, all in N. J.

2,010,894. **Belt.** D. Repony, Clifton, and J. H. Mattnews, Nutley, assignors to Raybestos-Manhattan, Inc., Passaic, all in N. J.

2,010,975. **Wheelbarrow.** G. M. Carter, Jackson, Mich.

2,010,987. **Cushioned Carriage.** C. Hammer, St. Paul, Minn.

2,011,015. **Wiper Blade.** P. E. Schleicher, Gary, Ind.

2,011,027. **Sanitary Garment.** H. W. Ballard and D. E. Krabbe, both of Los Angeles, Calif.

2,011,029. **Windshield Wiper.** A. E. Barnwell, Buffalo, N. Y.

2,011,174. **Heel Insert.** W. A. Evans, assignor of ½ to H. V. Morley and W. L. Morris, all of New York, N. Y.

2,011,194. **Hair Bandeau.** H. Eisler, New York, N. Y., assignor to Delamere Co., Inc., a corporation of Del.

2,011,209. **Aquatic Amusement Device.** H. L. Bertram, Cincinnati, O.

2,011,215. **Doorstop.** A. Evulich, Newark, Calif.

2,011,235. **Engine Mounting.** R. S. Trott, Denver, Colo.

2,011,248. **Printer's Blanket.** T. E. Knowlton, Watertown, N. Y.

2,011,293. **Electric Snap Switch.** A. W. Krieger, assignor to Cutler-Hammer, Inc., both of Milwaukee, Wis.

2,011,363. **Stencil.** E. M. Hommel, Pittsburgh, Pa., assignor to O. Hommel Co., a corporation of Pa.

2,011,375. **Motor Car Washer.** J. Rohan, New York, N. Y.

2,011,414. **Spreader Cap.** E. R. Oldham, assignor to Arabol Mfg. Co., both of New York, N. Y.

2,011,430. **Shoe Press.** J. O. Yunker, Wauwatosa, Wis.

2,011,462. **Undergarment.** A. M. Thomas, assignor to Thomas & Marcus, Inc., both of New York, N. Y.

2,011,468. **Composite Article.** B. Bronson, assignor to Ohio Rubber Co., both of Cleveland, O.

2,011,525. **Drain Cleaner.** V. S. Parsley, St. Petersburg, Fla.

2,011,545. **Container Closure and Applicator.** B. S. Thorp, Frankford, Pa., assignor to Whitall Tatum Co., New York, N. Y.

2,011,552. **Pneumatic Tire.** C. G. Hoover, assignor to Firestone Tire & Rubber Co., both of Akron, O.

Dominion of Canada

351,323. **Airplane Pickup Device.** Aero Pickup Service Corp., Boston, Mass., assignee of A. W. Card, Alexandria, Va., and H. G. Bushmeyer, deceased, in his lifetime of Westbury, L. I., N. Y., all in the U. S. A.

351,366. **Weatherstrip.** General Motors Corp., assignee of A. J. Fisher, both of Detroit, and A. A. Ruppert, Pleasant Ridge, co-inventors, all in Mich., U. S. A.

351,377. **Separable Fastener.** Lightning Fastener Co., Ltd., St. Catharines, Ont., assignee of G. Sundback, Meadville, Pa., U. S. A.

351,411. **Garment.** Wingfoot Corp., Wilmington, Del., assignee of W. C. Calvert, Cuyahoga Falls, O., both in the U. S. A.

351,417. **Equipoising Mechanism.** G. Carwardine, Bath, inventor, and Herbert Terry & Sons, Ltd., Redditch, assignee of ½ of the interest, both in England.

351,421. **Extension Valve.** H. S. Burke, assignee of W. A. Anglemyer, both of Indianapolis, Ind., U. S. A.

United Kingdom

424,353. **Swimming Appliance.** L. M. De Corlieu, Seine, France.

424,624. **Tray.** H. Rose, Hamburg, Germany.

424,718. **Draught Excluder.** A. Zehmann, Oberschlesien, Germany.

424,811. **Draught Excluder.** A. House, Bradford.

424,813. **Vehicle Spring Suspension.** L. J. Larrouze, Lyons, France.

424,830. **Forming Yarn.** British Celanese, Ltd., London, and W. I. Taylor, F. C. Hale, and A. H. Woodruff, all of Spondon.

424,877. **Door Fastener.** J. C. Cope and S. Gardner, both of Manchester.

424,879. **Producing Yarn.** British Celanese, Ltd., London, and W. I. Taylor, F. C. Hale, and A. H. Woodruff, all of Spondon.

424,944. **Window.** Automobile Ventilation, Inc., assignee of A. P. Ball, both of Detroit, Mich., U. S. A.

424,945. **Railway Wheel.** G. B. Howden, Dalkey, Co. Dublin, and R. W. Meredith, Dundalk, Co. Louth, both in the Irish Free State.

425,014. **Road Sweeper and Refuse Collector.** Etablissements Laffly, Seine, France.

425,072. **Hose.** F. B. Williamson, Elizabeth, N. J., U. S. A.

425,086. **Copper Wire Cleaner.** H. Scherrer, Berne, Switzerland.

425,090. **Windscreen.** L. Renault, Seine, France.

425,095. **Lifesaving Appliance.** G. J. Perot, Nice, France

425,101. **Rotating Abrasive Tool.** British United Shoe Machinery Co., Ltd., F. Ricks, and E. Hope, all of Leicester.

425,154. **Vehicle Spring Suspension.** Daimler-Benz A. G., Stuttgart, Germany.

425,162. **Reservoir Brush.** S. Orentreich, London.

425,176. **Toy.** E. Reynolds, London.

425,178. **Cow Milker.** G. F. Petheram, New Plymouth, New Zealand.

425,218. **Producing Prints on Paper.** Imperial Chemical Industries, Ltd., London, and A. A. Harrison and S. H. Oakshott, both of Manchester.

425,244. **Broom Holder.** G. W. Mallory, Blenheim, Ont., Canada.

425,312. **Vacuum Closure for Tins.** A. H. Downes-Shaw and A. S. Russell, both of Clifton, and A. L. Stuchbery, Enfield.

(*Continued on page* 68)

Market Reviews

CRUDE RUBBER

New York Quotations

New York outside market rubber quotations in cents per pound

	Sept. 25, 1934	Aug. 27, 1935	Sept. 26, 1935
Plantations			
Rubber latex, normal ....*gal.*	58½	46	49
Sheet			
Ribbed, smoked, spot	15 3/8/15 7/16	12 1/16/12 1/4	11 1/4/12 1/8
Oct.-Dec.	15 5/8/15 11/16	12 1/16/12 1/4	11 5/8/12 1/8
Jan.-Mar.	15 11/16/16	12 1/8/12 1/16	11 11/16/12 1/16
Apr.-June	16 1/16/16 3/8	12 5/8/12 3/4	12 1/16/12 5/8
Crepe			
No. 1 thin latex, spot	16 1/4/16 1/2	12 1/16/12 1/4	11 3/4/12 7/16
Oct.-Dec.	16 3/8/16 3/4	12 3/8/12 1/8	12 3/8/12 1/2
Jan.-Mar.	16 3/4/17 1/16	12 1/8/....	12 5/8/12 3/4
Apr.-June	17 1/4/17 3/8	12 3/4/12 7/8	12 3/4/12 11/16
No. 3 Amber, spot	12 1/2/12 3/4	11 1/8/11 1/16	11 3/8/11 1/16
No. 1 Brown	12 1/4/12 7/8	11 5/8/12	11 1/16/12
Brown rolled	10 1/8/10 3/8	10 1/16/10 3/4	10 1/2/11 1/16
Paras			
Upriver fine	11	10	10½
Upriver fine	*14¾	*12¼	*12½
Upriver coarse...	8½	7	7¼
Upriver coarse...	*11	*11¾	*11½
Islands fine	11½	10¾	11½
Islands fine	*14 3/8	*12½	*12½
Acre, Bolivian fine	11¼	10¾	10¾
Acre, Bolivian fine	*15	*12½	*12 5/8
Beni, Bolivian ...	11¼	10¼	11
Madeira fine	11	10	10½
Caucho			
Upper ball	8½	7	7¼
Upper ball	*11	*11¾	*11½
Lower ball	8	6¾	7
Pontianak			
Bandjermasin	..	7	7
Pressed block ...	..	11	11½
Sarawak	..	7	7
Guayule			
Duro, washed and dried	12	12	12
Ampar	13	13	13
Africans			
Rio Nuñez	12	12	12
Black Kassai	12	10	10
Prime Niger flake.	20	25	25
Gutta Percha			
Gutta Siak	..	11	12
Gutta Soh	..	12¾	14
Red Macassar ...	..	1.25	1.25
Balata			
Block, Ciudad Bolivar	..	32	32
Manaos block	..	26	27
Surinam sheets ..	..	35	30
Amber	..	38	35

*Washed and dried crepe. Shipments from Brazil.

Commodity Exchange

TABULATED WEEK-END CLOSING PRICES

Futures	Aug. 3	Aug. 31	Sept. 7	Sept. 14	Sept. 21
Aug.	12.13	.....	.....	.....	.....
Sept.	12.22	11.79	11.41	11.18	11.43
Oct.	.....	11.87	11.48	11.21	11.48
Dec.	12.37	12.04	11.65	11.39	11.66
Mar.	12.66	12.25	11.85	11.61	11.88
June	12.83	12.45	12.04	11.81	12.07
July	12.90	12.52	12.11	11.88	12.14
Aug.	.....	.....	12.18	11.96	12.21
Volume for week (tons)	9,490	18,050	8,330	7,200	9,240

THE above table gives the nearest first and last week-end closing prices of the month previous to that just closed, also the week-end closing prices of each week of last month up to time of going to press. This plan sets forth the general price trends in the briefest manner possible.

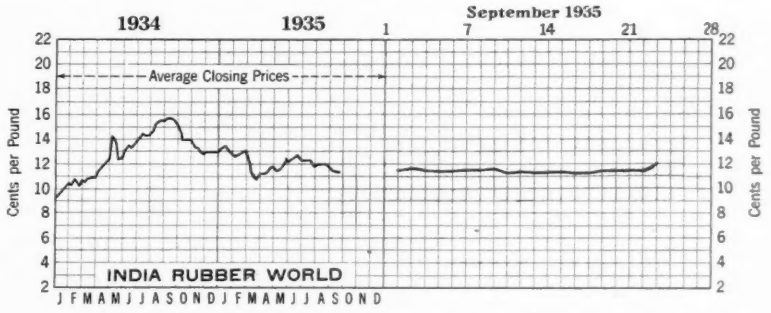
The downward trend of futures prices that started about mid-June continued throughout August and into September. The decline became more pronounced in the latter part of August because of the report that Malayan exports for July exceeded those of June by about 3,000 tons despite the reduction in quota to 65% becoming effective July 1. Declines became very sharp with September trading when it became known that August exports of Malaya and Ceylon were above those of July.

Fluctuations during most of the month were of wide range, often exceeding 18 to 20 points from one day to another. The alternating hope and despair of averting war in Africa with its consequent effect on business outlook was the fundamental cause although the uncertainty regarding the dependability of restriction naturally had a substantial bearing. During the week ended September 21 prices experienced the first sustained improvement of many weeks due apparently to a marked factory demand and the general expectation that the International Rubber Regulation Committee would take action further to strengthen restriction at the meeting scheduled for September 24. Beginning with September the exchange resumed its regular Saturday morning trading.

Last-minute reports reveal that the I. R. R. C. has set the permissible exportable quota of rubber for October-December, 1935, at 60%. This represents a reduction of 5%.

New York Outside Market

The price of No. 1 smoked sheets seemed to wage a courageous, but losing battle with the 12¢ level during August;



New York Outside Market—Spot Closing Prices Ribbed Smoked Sheets

New York Outside Market—Spot Closing Rubber Prices—Cents per Pound

	August, 1935						September, 1935															
	26	27	28	29	30	31*	2†	3	4	5	6	7	9	10	11	12	13	14	16	17	18	19	20	21
No. 1 Ribbed Smoked Sheet	12	11 13/16	11 13/16	11 7/8	11 13/16	..	..	11 1/2	11 13/16	11 7/8	11 7/8	11 7/8	11 1/2	11 7/8	11 5/8	11 3/8	11 7/8	11 3/4	11 3/4	11 7/8	11 3/8	11 3/8	11 1/2	11 1/4
No. 2 Ribbed Smoked Sheet	11 13/16	11 5/8	11 5/8	11 3/4	11 7/8	..	..	11 3/8	11 7/8	11 7/8	11 7/8	11 7/8	11 3/8	11 7/8	11 1/2	11 1/4	11 7/8	11 5/8	11 5/8	11 7/8	11 1/4	11 1/4	11 3/8	11 3/8
No. 3 Ribbed Smoked Sheet	11 11/16	11 1/2	11 1/2	11 5/8	11 7/8	..	..	11 1/4	11 7/8	11 7/8	11 7/8	11 3/4	11 7/8	11 3/8	11 3/8	11 7/8	11 7/8	11	11	11 3/8	11 3/8	11 3/8	11 1/4	11 7/8
No. 4 Ribbed Smoked Sheet	11 7/8	11 7/8	11 7/8	11 7/8	11 3/8	..	..	11 7/8	11 3/8	11 5/8	11 7/8	11 7/8	11 3/4	11 7/8	11 7/8	11 5/8	11	10 13/16	10 13/16	11 7/8	11 5/8	11 7/8	11 7/8	11 1/4
No. 1 Thin Latex Crepe...	12 1/8	12	12	12 1/8	12	..	..	11 5/8	11 13/16	11 3/4	11 13/16	11 13/16	11 3/4	11 13/16	11 13/16	11 5/8	11 7/8	11 1/2	11 1/2	11 7/8	11 5/8	11 5/8	11 3/4	11 3/4
No. 1 Thick Latex Crepe.	12	11 7/8	11 7/8	11 13/16	11 13/16	..	..	11 1/2	11 13/16	11 5/8	11 7/8	11 7/8	11 5/8	11 13/16	11 13/16	11 1/2	11 7/8	11 3/8	11 3/8	11 7/8	11 1/2	11 1/2	11 5/8	11 5/8
No. 1 Brown Crepe....	11 13/16	11 13/16	11 13/16	11 3/4	11 5/8	..	..	11 3/8	11 7/8	11 1/2	11 3/8	11 3/8	11 7/8	11 1/2	11 1/2	11 7/8	11 3/4	11 7/8	11 7/8	11 3/4	11 7/8	11 7/8	11 3/8	11 3/8
No. 2 Brown Crepe....	11 13/16	11 7/8	11 7/8	11 5/8	11 1/2	..	..	11 1/4	11 7/8	11 5/8	11 3/4	11 3/4	11 7/8	11 3/8	11 3/8	11 7/8	11 7/8	11 5/8	11 7/8	11 7/8	11 5/8	11 7/8	11 7/8	11 1/4
No. 2 Amber.....	11 13/16	11 13/16	11 13/16	11 3/4	11 5/8	..	..	11 3/8	11 7/8	11 1/2	11 3/8	11 3/8	11 7/8	11 1/2	11 1/2	11 7/8	11 3/4	11 7/8	11 7/8	11 7/8	11 3/4	11 7/8	11 7/8	11 3/8
No. 3 Amber.....	11 13/16	11 7/8	11 7/8	11 5/8	11 1/2	..	..	11 1/4	11 7/8	11 3/8	11 3/4	11 3/4	11 7/8	11 3/8	11 3/8	11 7/8	11 3/8	11 7/8	11 7/8	11 7/8	11 3/8	11 7/8	11 7/8	11 1/4
No. 4 Amber	11 7/8	11 7/8	11 7/8	11 3/8	11 1/4	..	..	11	11 7/8	11 1/2	11	11	11 1/2	11 7/8	11 7/8	11	10 7/8	10 13/16	10 13/16	10 7/8	11	11	11 1/4	11
Rolled Brown	10 7/8	10 7/8	10 7/8	10 1/2	10 7/8	..	..	10 1/4	10 7/8	10 3/8	10 1/4	10 1/4	10 3/8	10 7/8	10 7/8	10 1/4	10 7/8	10 3/8	10 3/8	10 3/8	10 1/4	10 1/4	10 7/8	10 3/8

*Closed. †Holiday.

while September prices followed the pattern of the futures market in regions below 11¼¢, with demand at even these figures comparatively light, except during the week ended September 21 when marked improvement came about. The week-end prices for August and September to date follow: August 3, 12¼¢; August 10, 11¾¢; August 17, 11⅞¢; August 24, 12⅛¢; August 31, 11⅞¢; September 7, 11⅞¢; September 14, 11¾¢; September 21, 11⅝¢.

The R. M. A. reported the consumption of rubber in the United States for August was 39,242 long tons compared with 36,384 for July. The August consumption exceeded that of July by 7.9% and of August, 1934, by 18.1%.

The action of the I. R. R. C. in further tightening restriction has resulted in an immediate increase of ⅛¢ per pound, bringing the price to the 12¢ level again.

GENERAL

United Kingdom

(*Continued from page* 64)

425,330. **Air Cushion.** Arliss, Ltd., H. C. Stanley, and W. H. Smith, all of Manchester.

425,359. **Dish Washer.** C. Farnfield, London.

425,429. **Dynamo Electric Machine Cooler.** Ateliers De Constructions Electriques De Charleroi, Brussels, Belgium.

425,479. **Coin Freed Coupon Issuer.** W. J. Doherty, Haberfield, and E. F. Gilford, Petersham, both in N. S. W., Australia.

425,526. **Milk Bottle Receiving Bin.** S. H. Instone, London.

425,531. **Vehicle Luggage Carrier.** J. Van De Graaf, Rotterdam; J. Gast, Hillegersberg; and J. H. Van Kranenburg, Rotterdam, all in Holland.

425,532. **Bicycle.** Anker-Werke A. G., Bielefeld, Germany.

425,575. **Trouser Supporter.** Co-operative Wholesale Society, Ltd., Manchester, and J. F. Close, Kenton.

425,585. **Refrigerator Evaporator.** British Thomson-Houston Co., Ltd., London.

425,638. **Drinking Vessel Washer.** C. Chambers, Birmingham.

425,650. **Elastic Lace.** T. Lebas, Calais, France.

425,670. **Inflatable Lifebuoy.** G. A. Evenden and G. F. Wilson, both of Hamilton, Ont., Canada.

425,688. **Table Game Apparatus.** J. F. G. Osborne, Glasgow, Scotland.

425,716. **Centrifugal Machine.** R. Haddan, London. (Western States Machine Co., Salt Lake City, Utah, U. S. A.)

425,736. **Rock Drill.** W. Collier, Glamorgan, Wales.

425,748. **Automatic Circuit Breaker.** Felten & Guilleaume Carlswerk A. G., Cologne, Germany.

425,765. **Securing Bowls to Tables.** A. H. Hunter, London.

425,809. **Sheet-Wood Material.** A. Elmendorf, London.

425,824. **Sliding Seat.** H. L. Sleigh and A. S. Cheston, both of Birmingham.

425,833. **Throwing Appliance.** E. W. Brown, Edinburgh, Scotland.

425,958. **Scouring Appliance.** R. B. Kingman, Orange, N. J., U. S. A.

425,974. **Compound Fabric.** P. C. Petroff, Paris, France.

425,993. **Wearing Apparel.** J. A. Chappuis, Peseux-Neuchatel, Switzerland, and Lightning Fasteners, Ltd., London.

426,021. **Hand Stamp.** E. Clifton, London; C. Ramsden, Romford; and G. P. Hicks and W. Jones, Clifton & Co., Ltd., both of London.

426,043. **Washing Machine.** Electric Household Utilities Corp., Chicago, Ill., U. S. A.

426,078. **Saddle.** A. Moss, Walsall.

426,081. **Dog Leash.** J. D. Turner, Dunkeld, Scotland.

426,088. **Rotary Abrasive Tool.** British United Shoe Machinery Co., Ltd., F. Ricks, E. Hope, and W. R. Barclay, all of Leicester.

426,090. **Atomic Hydrogen Torch.** A. L. Guest, Wrexham, Wales; D. A. Pearson, Manchester; and Associated Electrical Industries, Ltd., London.

426,097. **Specific Gravity Estimator.** Chloride Electrical Storage Co., Ltd., Clifton Junction, and H. F. Acreman, Romford.

426,099. **Conductor.** British Thomson-Houston Co., Ltd., London.

426,108. **Glove.** W. Sykes, Ltd., Horbury, and J. Leary, Exeter.

426,140. **Spirometer.** G. Mansfeld, Pécs, Hungary.

426,159. **Ventilating Footwear.** A. Howe and J. H. Clarke, (trading as J. H. Clarke & Co.), both of Leicester.

426,171. **Anaesthetic Apparatus.** J. Carre, Nord, France.

426,194. **Sparking Plug.** R. Bosch A. G., Stuttgart, Germany.

426,198. **Elastic Compound Sheet Material.** Revere Rubber Co., Providence, R. I., U. S. A.

426,204. **Windscreen Cleaner.** B. H. Baker, London.

426,269. **Color Screen.** E. R. Holiday, London.

426,298. **Respirator.** G. Francon, Loire, France.

426,312. **Electric Hand Lamp.** Allmanna Svenska Elektriska Aktiebolaget, Västeras, Sweden.

426,329. **Wheel.** E. H. South, Salisbury, Southern Rhodesia.

426,410. **Exerciser.** A. Abplanalp and E. Nigg, both of London.

426,436. **Arch Support.** P. Schwenker, Thuringia, Germany.

426,440. **Road Roller.** N. E. Box, Altrincham.

426,457. **Skate.** R. Cledina, Liege, Belgium.

426,468. **Exerciser.** M. A. Pyke, London.

426,523. **Centrifugal Pump.** J. M. Wallwin, Warwick.

426,524. **Tire Valve.** S. T. Williams, Bellerose, N. Y., U. S. A.

426,607. **Feeding Bottle.** H. A. Yager, Long Beach, Calif., U. S. A.

426,655. **Joint Packing.** Abingdon Works (1931), Ltd., T. B. Bramley, and J. Gray, all of Birmingham.

426,683. **Carbon Paper.** C. L. H. Suppligeau and R. R. J. Guyot, both of Seine, France.

426,684. **Endless Belt Conveyer.** R. J. Southwell and T. H. Wickwire, both of New York, N. Y., U. S. A.

426,736. **Teapot.** G. V. Rayner and S. W. Dean, both of London.

426,743. **Phototherapeutic Apparatus.** E. Potter, London. (Hanovia Chemical & Mfg. Co., Newark, N. J., U. S. A.)

426,794. **Vehicle Lamp.** J. Lucas, Ltd., and O. Lucas, both of Birmingham.

426,806. **Sand-Faced Brick Mold.** J. W. Edwards, Canterbury.

426,826. **Electric Lamp Standard.** D. Moseley & Sons, Ltd., and A. Jackson, both of Manchester.

426,984. **Driving Belt.** C. C. Gates, Denver, Colo., U. S. A.

427,031. **Hot Water Bottle.** W. B. Tidman, London.

427,098. **Battery.** P. R. Mallory & Co., Inc., Indianapolis, Ind., U. S. A.

427,151. **Plug Coupling.** C. Crofton & Co. (Engineers), Ltd., and H. B. Crofton, both of Northumberland.

427,164. **Two-Part Coupling.** R. Bosch A. G., Stuttgart, Germany.

427,171. **Signaling Conductor.** Norddeutsche Seekabelwerke A. G., Oldenburg, Germany.

427,307. **Specific Gravity Estimator.** Chloride Electrical Storage Co., Ltd., and A. W. Browne, both of Clifton Junction.

Germany

617,131. **Inner Tube.** O. Egli, Winterthur, Switzerland. Represented by K. Boehmert, Berlin.

618,076. **Anti-Skid Device for Tires.** L. Kalin, Zurich, Switzerland. Represented by T. v. Laczay, Berlin.

618,198. **Tire.** S. Palli, Turin, Italy. Represented by M. Mossig, Berlin.

618,436. **Heel.** A. Brugger, Wuppertal-Barmen.

TRADE MARKS

United States

326,147. **Firestone.** Hose cutting, tire builders', and tire repair knives and separate blades therefor; machinery vibration insulating mountings; tire repair and changing tools, etc. Firestone Tire & Rubber Co., Akron, O.

326,153. **La Marge.** Syringes and water bags. F. R. Belfrage, doing business as LaMarge Products Co., Kansas City, Mo.

326,158. **Sani-Scant.** Sanitary bloomers and step-ins. I. B. Kleinert Rubber Co., New York, N. Y.

326,214. **KnaboB Brand.** Prophylactic rubber articles. Lymans, Ltd., Montreal, P. Q., Canada.

326,233. **Neophan.** Gas masks, respirators, dental and surgical appliances. D E G E A Aktiengesellschaft (Auergesellschaft), Berlin, Germany.

326,356. **All-American.** Tires. Goodyear Tire & Rubber Co., Akron, O.

326,359. Monogram: **"DTB."** Dental supplies including gutta percha. E. De Trey, Zurich, Switzerland.

326,367. **Big Six.** Tires and tubes. United States Rubber Products, Inc., New York, N. Y

326,368. **Big Four.** Tires. United States Rubber Products, Inc., New York, N. Y.

326,450. Label containing representation of an Indian's head, and the word: **"Tomac."** Surgical rubber goods, etc. American Hospital Supply Corp., Chicago, Ill.

COMPOUNDING INGREDIENTS

THE demand for compounding ingredients shows marked activity over that of the past summer and bids fair to show continued gains for the near future. Two recent additions of much interest to rubber compounders and technologists are Thiokol C-103[1] and Thiokol D.[2] Both are perfected rubber-like synthetic gums adapted for compounding with rubber for making oil resistant products.

[1] See page 52.
[2] See page 48.

CARBON BLACK. The market is very firm and active for this material; consumption has markedly exceeded production this year; stocks are comfortably low, and prices firmly quoted. The producing situation in Texas has been much upset by the application of the new gas conservation laws. It is still too early to make any definite statements as to the full and final effect of the new laws and the regulations issued under them.

FACTICE. No changes have been made in prices, and the demand continues fair.

LITHARGE. Demand is routine. The last week of September a slight rise in price (0.15¢) per pound took place.

SOLVENTS. Good demand for petroleum solvents prevails in the rubber trade, especially among tire manufacturers.

ZINC OXIDE. Practically no change in the market situation is noted as regards zinc oxides for the rubber industry. Prices hold firm and are much improved as compared with those of a year ago.

New York Quotations

September 26, 1935

Prices Not Reported Will Be Supplied on Application

Abrasives		
Pumicestone, powdered	lb.	
Rottenstone, domestic	lb.	
Silica, 15	ton	$38.00
Accelerators, Inorganic		
Lime, hydrated	ton	20.00
Litharge (commercial)	lb.	.06½/$0.07
Magnesia, calcined, heavy	lb.	.04
carbonate	lb.	.06½
Accelerators, Organic		
A-1	lb.	.21 /$0.25
A-5-10	lb.	.33 / .36
A-10	lb.	
A-11	lb.	.60 / .75
A-16	lb.	.55 / .65
A-19	lb.	.56 / .75
A-32	lb.	.70 / .80
A-77	lb.	
Accelerator 49	lb.	.40 / .50
85	lb.	
87	lb.	
122	lb.	
552	lb.	
808	lb.	
833	lb.	
Acrin	lb.	
Aldehyde ammonia	lb.	
Altax	lb.	
Beutene	lb.	
Butyl Zimate	lb.	
C-P-B	lb.	
Captax	lb.	
Crylene	lb.	
Paste	lb.	
D-B-A	lb.	
Di-Esterex	lb.	
Di-Esterex-N	lb.	
DOTG	lb.	.44 / .54
D.O.T.T.U.	lb.	
DPG	lb.	.35 / .45
Ethylideneaniline	lb.	
Formaldehyde P.A.C.	lb.	
Formaldehydeaniline	lb.	
Formaldehyde-para-toluidine	lb.	
Guantal	lb.	.42 / .51
Hepteen	lb.	
Base	lb.	
Hexamethylenetetramine	lb.	
Lead oleate, No. 999	lb.	.12
Witco	lb.	.11
Methylenedianilide	lb.	
Monex	lb.	
Novex	lb.	
Pipsolene	lb.	
R-2	lb.	1.50 / 1.90
Base	lb.	4.55 / 5.00
R & H 50-D	lb.	
Safex	lb.	
Super-sulphur No. 1	lb.	
No. 2	lb.	
Tepidone	lb.	
Tetrone A	lb.	
Thiocarbanilide	lb.	
Thionex	lb.	
Trimene	lb.	
Base	lb.	
Triphenyl guanidine (TPG)	lb.	
Tuads	lb.	
Ureka	lb.	.62 / 1.00
Blend B	lb.	
C	lb.	.58 / .69
Vulcanex	lb.	
Vulcanol	lb.	
Vulcone	lb.	
Z-B-X	lb.	
Z-88-P	lb.	.48 / .60
Zenite	lb.	
A	lb.	
B	lb.	
Zimate	lb.	
Activator		
Barak	lb.	
Age Resisters		
Age-Rite Gel	lb.	
HP	lb.	
Powder	lb.	
Resin	lb.	
Syrup	lb.	
White	lb.	
Akroflex A	lb.	
B	lb.	
C	lb.	
Albasan	lb.	
Antox	lb.	
A-V-A-R	lb.	
B-L-E	lb.	
Flectol B	lb.	
H	lb.	
White	lb.	
M-U-F	lb.	
Neozone (standard)	lb.	
A	lb.	
C	lb.	
D	lb.	
E	lb.	
Oxynone	lb.	
Parazone	lb.	
Permalux	lb.	
Solux	lb.	
Thermoflex	lb.	
A	lb.	
V-G-B	lb.	
Alkalies		
Caustic soda, flake, Columbia (400 lb. drums)	100 lbs.	$3.00 /$4.00
liquid, 50%	100 lbs.	2.25
solid (700 lb. drums)	100 lbs.	2.60 / 3.60
Antiscorch Materials		
Antiscorch T	lb.	
Cumar RH	lb.	.085
Retarder B	lb.	
W	lb.	
U.T.B.	lb.	
Antisun Materials		
Heliozone	lb.	
Sunproof	lb.	
Binder, Fibrous		
Asbestos	ton	30.00
Brake Lining Saturants		
B. R. C. No. 553	lb.	.015 / .017
B. R. T. No. 3	lb.	.015 / .017
Colors		
BLACK		
Lampblack (commercial)	lb.	.15
BLUE		
Brilliant	lb.	
Prussian	lb.	.40
Toners	lb.	.80 / 3.50
Ultramarine, dry, Group 1	lb.	.14
BROWN		
Mapico	lb.	.13
GREEN		
Brilliant	lb.	
Chrome, light	lb.	$0.20
medium	lb.	.20
oxide	lb.	.18½
Dark	lb.	
Guignet's	lb.	.75
Light	lb.	
Toners	lb.	.85 /$3.50
ORANGE		
Lake	lb.	
Toners	lb.	.40 / 1.60
ORCHID		
Toners	lb.	1.50 / 2.00
PINK		
Toners	lb.	1.50 / 4.00
PURPLE		
Permanent	lb.	
Toners	lb.	.60 / 2.00
RED		
Antimony		
Crimson, 15/17%	lb.	.50
R. M. P. No. 3	lb.	.46
Sulphur free	lb.	.48 / .55
Golden 15/17%	lb.	.28
7-A	lb.	.33
Z-2	lb.	.20
Aristi	lb.	1.70
Cadmium	lb.	.75 / .80
Chinese	lb.	
Crimson	lb.	
Mapico	lb.	
Medium	lb.	
Scarlet	lb.	
Rub-Er-Red	lb.	.09¼
Toners	lb.	.80 / 2.00
WHITE		
Lithopone (bags)	lb.	.04½/ .04¾
Albalith Black Label	lb.	.04½/ .04¾
Astrolith (5-ton lots)	lb.	.04½/ .04¾
Azolith	lb.	.04½/ .04¾
Cryptone-19	lb.	.06 / .06¼
CB-21	lb.	.06 / .06¼
ZS No. 20	lb.	.10½/ .10¾
No. 86	lb.	.10½/ .10¾
Sunolith (5-ton lots)	lb.	.04½/ .04¾
Ray-Bar	lb.	
Ray-Cal	lb.	
Rayox	lb.	
Titanolith (5-ton lots)	lb.	.06 / .06¼
Titanox-A	lb.	.17 / .18¼
B	lb.	.06 / .06½
C	lb.	.06 / .06½
Ti-Tone	lb.	
Zinc Oxide		
Anaconda, Green Seal No. 333	lb.	.09¾/ .09¾
Lead Free No. 352	lb.	.05¾/ .06
No. 570	lb.	.05¾/ .06
No. 577	lb.	.05¾/ .06
Red Seal No. 222	lb.	.08¾/ .08¾
U.S.P. No. 777 (bbls.)	lb.	.12¾
White Seal No. 555	lb.	.10¾
Azo ZZZ-11	lb.	.05¾/ .06
44	lb.	.05¾/ .06
55	lb.	.05¾/ .06
66	lb.	.05¾/ .06
French Process, Florence White Seal-7 (bbls.)	lb.	.06¾
Green Seal-8	lb.	.06¾/ .06½
Red Seal-9	lb.	.05½/ .05¾
Kadox, Black Label-15	lb.	.05 / .05¼
Blue Label-16	lb.	.05 / .05¼
Red Label-17	lb.	.05 / .05¼

Horse Head Special 3....lb.	$0.05	/$0.05¼
XX Red-4....lb.	.05	/ .05¼
23....lb.	.05	/ .05¼
72....lb.	.05	/ .05¼
78....lb.	.05	/ .05¼
80....lb.	.05	/ .05¼
103....lb.	.05	/ .05¼
110....lb.	.05	/ .05¼
St. Joe (lead free)		
Black Label No. 20....lb.	.05¾	/ .06
Green Label No. 42....lb.	.05¾	/ .06
Red Label No. 30....lb.	.05¾	/ .06
U.S.P. X....lb.	.08	/ .08¼
YELLOW		
Cadmolith (cadmium yellow).lb.	.40	/ .45
Lemon....lb.		
Mapico....lb.	.09½	
Toners....lb.	2.50	

Dispersing Agents

Bardex....lb.	.023	/ .025
Bardol....lb.	.021	/ .023
Darvan....lb.		

Factice—See Rubber Substitutes

Fillers, Inert

Asbestine, c.l., f.o.b. mills.ton	15.00	
Barytes....ton	30.00	
f.o.b St. Louis (50 lb. paper bags)....ton	22.85	
off color, domestic....ton		
white, imported....ton		
Blanc fixe, dry, precip....ton		
Calcene....ton	35.00	/43.00
Infusorial earth....lb.	.02	
Kalite No. 1....ton		
No. 3....ton		
Whiting		
Columbia Filler....ton	9.00	/14.00
Domestic....100 lbs.		
Guilders....100 lbs.		
Hakuenka....lb.		
Paris white, English cliff-stone....100 lbs.		
Southwark Brand, Commercial....100 lbs.		
All other grades..100 lbs.		
Suprex, white, extra light.ton	45.40	/60.00
heavy....ton	45.40	/60.00
Witco, c.l....ton	7.00	
Wood flour....ton	21.00	/50.00

Fillers for Pliability

Fumonex, c.l., f.o.b. works, bags....lb.	.03	
l.c.l., f.o.b. warehouse..lb.	.05½	/ .07
P-33....lb.		
Thermax....lb.		
Velvetex....lb.	.03	/ .04½

Finishes

IVCO lacquer, clear....gal.		
colors....gal.		
Rubber lacquer, clear....gal.		
colored....gal.		
Starch, corn, pwd....100 lbs.	3.68	/ 3.88
potato....lb.	.04½	/ .05½
Talc, dusting....ton		
Pyrax....ton		

Flock

Cotton flock, dark....lb.	.10½	/ .11½
dyed....lb.	.80	/ .85
white....lb.	.14½	/ .20
Rayon flock, colored....lb.	1.25	/ 1.40
white....lb.	1.00	

Latex Compounding Ingredients

Alphasol-OS....lb.		
Antox, dispersed....lb.		
Aquarex D....lb.		
F....lb.		
Aresklene....lb.		
Casein, domestic, ground, 20-30 mesh....lb.	.11½	
Catalpo....ton		
Color pastes, dispersed....lb.		
Dispersaid....lb.	1.50	
Dispersex 10....lb.	.75	
15....lb.	.95	
20....lb.	.75	
Emo, brown....lb.	.13	
white....lb.	.13	
Factice Compound, dispersed....lb.	.25	
Heliozone, Dispersed....lb.		
Igepon A....lb.		
Micronex, Colloidal (75 lbs.).lb.	.11	
320 lbs....lb.	.08	
Nekal BX (dry)....lb.		
Palmol....lb.	.085	
Stablex A....lb.	1.75	
B....lb.	.90	
C....lb.	.30	
Sulphur, Colloidal....lb.		
Vulcan Colors....lb.		
Zinc oxide, Colloidal....lb.		

Mineral Rubber

B. R. C. No. 20....lb.	.0125/	.014
Black Diamond....ton	25.00	
Genasco Hydrocarbon, granulated, (fact'y)...ton		
solid....ton		
Gilsonite Hydrocarbon (factory)....ton		
Hydrocarbon, hard....ton		
soft....ton		
Parmr Grade 1 (f.o.b. Bayonne)....ton	$30.00	
Grade 2....ton	30.00	
265°....ton		

Mold Lubricants

Mold Paste No 1....lb.		
Rusco mold paste....lb.	.12	/ .30
Sericite....ton		
Soapbark....lb.		
Soapstone....ton	25.00	/30.00

Reclaiming Oils

B. R. V....lb.	.039	/ .041
S. R. O....lb.	.012	/ .014

Reenforcers

Carbon Black		
Aerfloted Arrow Specification Black....lb.	.0535/	.0825
Arrow Compact Granualized Carbon Black....lb.		
"Certified" Spheron, Cabot.lb.		
Disperso (delivered)....lb.	.0445/	.0535
Dixie, c.l., f.o.b. New Orleans, La., Galveston or Houston, Tex....lb.	.0445	
c.l., delivered New York.lb.	.0535	
local stock delivered..lb.	.07	/ .08¼
Dixiedensed, c.l, f.o.b. New Orleans, La., Galveston or Houston, Tex....lb.	.0445	
c.l., delivered New York.lb.	.0535	
local stock delivered..lb.	.07	/ .08¼
Excello, c.l., f.o.b Gulf ports....lb.	.0445	
delivered New York.lb.	.0535	
l.c.l., delivered New York....lb.	.07	/ .08¼
Gastex....lb.	.03	/ .07
Kosmobile, c.l., f.o.b New Orleans, La., Galveston or Houston, Tex....lb.	.0445	
c.l., delivered New York.lb.	.0535	
local stock delivered..lb.	.07	/ .08¼
Kosmos, c.l., f.o.b. New Orleans, La., Galveston or Houston, Tex....lb.	.0445	
c.l., delivered New York.lb.	.0535	
local stock delivered..lb.	.07	/ .08¼
Micronex Beads....lb.		
Mark II....lb.		
Standard....lb.		
W-5....lb.		
W-6....lb.		
Pelletex....lb.		
Supreme, c.l., f.o.b. Gulf ports....lb.	.0445	
delivered New York..lb.	.0535	
l.c.l., delivered New York....lb.	.07	/ .08¼
Carbonex....lb.	.030	/ .0375
Carbonex "S"....lb.	.0315/	.040
Clays		
Aerfloted Paragon....ton	8.50	
Suprex No. 1 Selected.ton	10.00	
No. 2 Standard....ton	8.50	
Dixie....ton		
Junior....ton		
McNamee....ton		
Par....ton		
Witco....ton	8.50	
Cumar EX....lb.	.04	

Reodorants

Amora A....lb.		
B....lb.		
C....lb.		
D....lb.		
Para-Dors....lb.		
Rodo No. 0....lb.		
No. 10....lb.		

Rubber Substitutes or Factice

Amberex....lb.	.20	
Black....lb.	.07	/ .11
Brown....lb.	.07	/ .12
Duphax A....lb.	.095	
B....lb.	.095	
Fac-Cel B....lb.	.12	
C....lb.	.12	
White....lb.	.08½	/ .12

Softeners

B. R. C. No. 555....lb.	.012	/ .014
B. R. T. No. 7....lb.	.015	/ .017
Burgundy pitch....lb.	.04	/ .05
(net weight)....lb.	.07	/ .08½
Cycline oil....gal.	.15	/ .28
Palm oil (Witco)....lb.	.06	
Petrolatum, light amber....lb.	.03½	/ .03¾
Pigmentar (drums)....gal.	.25	/ .27
Pigmentaroil (drums)....gal.	.25	/ .27
Pine oil, dest. distilled (drums)....gal.	.44	/ .48
pitch....bbl.	6.00	
tar (drums)....gal.	.25	/ .27
Plastogen....lb.		
Reogen....lb.		
Rosin oil, compounded....gal.	.40	
Rubtack....lb.	.10	
Tacko....lb.	.085	/ .18
Tonox....lb.		
Powder....lb.		
Witco No. 20....gal.	.15	

Softeners for Hard Rubber Compounding

RSL Resin....lb.		
Resin C Pitch 55° C. M. P....lb.	$0.0125/	$0.0145
Resin C Pitch 70° C. M. P....lb.	.0125/	.0145
Resin C Pitch 85° C. M. P....lb.	.0126/	.0145

Solvents

Benzol 90% (drums)....gal.	.20	
Beta-Trichlorethane....gal.		
Bondogen....gal.		
Carbon bisulphide....lb.	.05¼	/ .08½
tetrachloride....lb.	.05¼	
Dipentene, commercial (drums)....gal.	.42	/ .44
Rubber (Group 3, refinery)..gal.	.06¾	/ .07¼
Solvesso No. 1, tank cars..gal.	.17½	
No. 2....gal.	.22½	
No. 3....gal.	.17½	
No. 4....gal.	.22½	
Turpentine, wood, dest. distilled (drums)....gal.	.41	/ .43

Stabilizers for Cure

Laurex, ton lots....lb.		
Stearex B....lb.	.10¾	/ .11¾
Beads....lb.	.084	/ .094
Stearic acid, single pressed.lb.	.11	/ .13
Stearite....lb.	.08	
Zinc stearate....lb.		

Synthetic Rubber

DuPrene Latex Type 50..gal.		
Type D....lb.		

Tackifier

B. R. H. No. 2....lb.	.015	/ .020

Varnish

Shoe....gal.	1.45	

Vulcanizing Ingredients

Sulphur		
Chloride, drums....lb.	.03½	/ .04
Rubber....100 lbs.	1.95	/ 2.75
Telloy....lb.		
Vandex....lb.		

(See also Colors—Antimony)

Waxes

Carnauba, No. 3 chalky...lb.	.38½	/ .39
2 N.C....lb.	.43	
3 N.C....lb.	.39	/ .39½
1 Yellow....lb.	.50	/ .51
2....lb.	.49	/ .50
Montan, crude....lb.	.11	

Rubber Trade Inquiries

The inquiries that follow have already been answered; nevertheless they are of interest not only in showing the needs of the trade, but because of the possibility that additional information may be furnished by those who read them. The Editor is therefore glad to have those interested communicate with him.

No.	Inquiry
1874	Manufacturer of material to adhere rubber to metal.
1875	Manufacturer of tire slitting machines.
1876	Manufacturer of small molded parts for automotive necessities.
1877	Manufacturer of electric vulcanizers.
1878	Supplier of ground rubber scrap.
1879	Manufacturer of machines for grinding rubber scrap.
1880	Manufacturer of cutting dies.
1881	Manufacturer of machines for making bias binding ribbons.
1882	Manufacturer of powdered talc.
1883	Manufacturer of Nevinol.
1884	Manufacturer of kneeling pads and mats.
1885	Manufacturer of prong mats in rolls.
1886	Manufacturer of rubber wheels for vacuum cleaners.
1887	Manufacturer of replacement belts for vacuum cleaners.
1888	Manufacturer of sealing compounds for cans.
1889	Manufacturer of porous hard rubber.
1890	Manufacturer of rubber substitutes.
1891	Manufacturer of rubber colors.
1892	Manufacturer of French Foam.
1893	Supplier of gutta percha in sheet form.
1894	Manufacturer of silver ink for rubber articles.
1895	Manufacturer of rubber goods used in oil wells.
1896	Manufacturer of material used in making composition buttons for wearing apparel.
1897	Manufacturer of shoe varnish.
1898	Manufacturer of molded rubber pipettes.
1899	Formula wanted for manufacturing camelback.
1900	Manufacturer of rubber sheets for soling.
1901	Manufacturer of machine to grind cured rubber into a fine powder.
1902	Manufacturer of rubber cement.
1903	Manufacturer of rubber dolmans.
1904	Manufacturer of rubber applicator tops for mucilage bottles.

COTTON AND FABRICS

NEW YORK COTTON EXCHANGE WEEK-END CLOSING PRICES

Futures	Aug. 3	Aug. 31	Sept. 7	Sept. 14	Sept. 21
Aug.	11.30	.....	.....	.....	.....
Sept.	11.35	10.31	10.35	10.31	10.46
Oct.	.....	10.31	10.35	10.31	10.46
Dec.	11.24	10.33	10.35	10.35	10.51
Mar.	11.16	10.44	10.45	10.43	10.64
July	11.10	10.50	10.55	10.57	10.74

THE above table gives the nearest first and last week-end closing prices of the month previous to that under review, also the week-end closing prices of each week of last month up to time of going to press. This plan permits tracing at a glance the prices of representative futures for approximately two consecutive months.

The sudden action of Congress in amending the Agricultural Adjustment Act in the final hours of last session came as an unexpected and not too welcome action. The reduction of government loan from 12¢ to a 10¢ basis brought an immediate break in the market, which caused August to close with near contracts selling for about 1¢ per pound below the prices prevailing at the beginning of that month. The usual daily fluctuations occurred during September, but the general trend leveled in the region between 10.30 and 10.50 for the near-month contracts.

A general lack of understanding of the full interpretation and effect of the amendment prevented active trading interest. Interpretations given by government departments were to the effect that the 10¢ loan would apply to all cotton from restricted acreage, but the possible grant will apply only to the quantity allotments of each farmer. It has also been revealed that the grant is limited to 2¢; if the owner sells below 10¢, he is not protected to 12¢ as was originally thought.

Secretary Wallace has indicated that this plan will stimulate export sales and that the effect is now being realized. Much speculation is being made as to the influence a European war will have on the cotton situation; so far it has had no stimulating effect although cotton is said to have been exported for ammunition manufacture.

Since the latter part of August textile mills have been active buyers of cotton.

Cotton Fabrics

DUCKS, DRILLS, AND OSNABURGS. Market prices have increased in firmness since August, and volume of business as well. Active operators have shown more interest in far forward requirements than since mid-year of 1933. The smaller trade is still lagging and apparently finding it difficult to realize that the market, dull for so long, can in fact come to a basis of advancing prices and growing scarcity of fabrics for delivery earlier than six to eight weeks hence. Textile manufacturers are booking forward engagement of their production for about four months ahead and apparently have begun to drive vigorously for capacity production.

In the face of the decline in raw material of $10 a bale since mid-August fabrics have not only held their price positions but have advanced, thus manifesting greater resilience and strength than had been expected of cloth markets. This evidence of strength stirs the interest of traders to order against their future needs.

RAINCOAT MATERIALS. Trade in these goods is seasonally dull, pending sampling on spring models.

SHEETINGS. The market is extremely active with heavy buying at advancing prices.

TIRE FABRICS. Demand is moderate and seasonal; while prices continue unchanged.

WEEKLY AVERAGE PRICES OF MIDDLING COTTON

Week Ended	Cents per Pound
Aug. 31	10.84
Sept. 7	10.69
Sept. 14	10.78
Sept. 21	10.87

New York Quotations

September 26, 1935

Drills		
38-inch 2.00-yard	yd.	$0.15
40-inch 3.47-yard		.09
50-inch 1.52-yard		.21½
52-inch 1.85-yard		.17¾
52-inch 1.90-yard		.15½
52-inch 2.20-yard		.14¼
52-inch 2.50-yard		.12½
59-inch 1.85-yard		.15½
Ducks		
38-inch 2.00-yard D. F.	yd.	.14¾/.15
40-inch 1.45-yard S. F.		.20¾
51½-inch 1.35-yard D. F.		.21½
72-inch 1.05-yard D. F.		.28½/.29½
72-inch 17.21-ounce		.33⅜
MECHANICALS		
Hose and belting	lb.	.34
TENNIS		
52-inch 1.35-yard	yd.	.22½
***Hollands**		
GOLD SEAL		
30-inch No. 72	yd.	.19
40-inch No. 72		.20
RED SEAL		
30-inch	yd.	.16½
40-inch		.17½
50-inch		.23
Osnaburgs		
40-inch 2.34-yard	yd.	.12 /.12⅝
40-inch 2.48-yard		.11⅜
40-inch 2.56-yard		.11
40-inch 3.00-yard		.10
40-inch 7-ounce part waste		.11
40-inch 10-ounce part waste		.16⅜
37-inch 2.42-yard		.12¼
Raincoat Fabrics		
COTTON		
Bombazine 60 x 64	yd.	.09
Plaids 60 x 48		.11½
Surface prints 60 x 64		.12½
Print cloth, 38½-inch, 60 x 64		.06¼
SHEETINGS, 40-INCH		
48 x 44, 2.50-yard	yd.	.11
64 x 68, 3.15-yard		.09¾
56 x 60, 3.60-yard		.08½
44 x 48, 3.75-yard		.06¾
SHEETINGS, 36-INCH		
48 x 40, 5.00-yard	yd.	.05⅝
44 x 40, 6.15-yard		.04⅞
Tire Fabrics		
BUILDER		
17¼ ounce 60" 23/11 ply Karded peeler	lb.	.36
CHAFER		
14 ounce 60" 20/8 ply Karded peeler	lb.	.36
9¼ ounce 60" 10/2 ply Karded peeler	lb.	.36
CORD FABRICS		
23/5/3 Karded peeler, 1 1/16" cotton	lb.	.36
15/3/3 Karded peeler, 1 1/16" cotton	lb.	.34
23/5/3 Karded peeler, 1¼" cotton	lb.	.43
23/5/3 Combed Egyptian	lb.	.50
LENO BREAKER		
8¼ ounce and 10¼ ounce 60" Karded peeler	lb.	.31

*For less than 1,000 yards of a width add 10% to given prices.

RUBBER SCRAP

THE market is very steady on all grades of scrap. No changes in quotations for standard grades are noted this month except an increase of ⅛¢ on red inner tubes.

BOOTS AND SHOES. All grades are very firm. Collections are poor.

INNER TUBES. All grades are firm and steady. Red tubes are slightly increased, as noted above.

TIRES. A notable increase of demand is anticipated for the next ninety days.

SOLID TIRES. Demand is fair, supply poor, and the market steady.

MECHANICALS. All grades are in steady, but moderate demand at prices firm and unchanged.

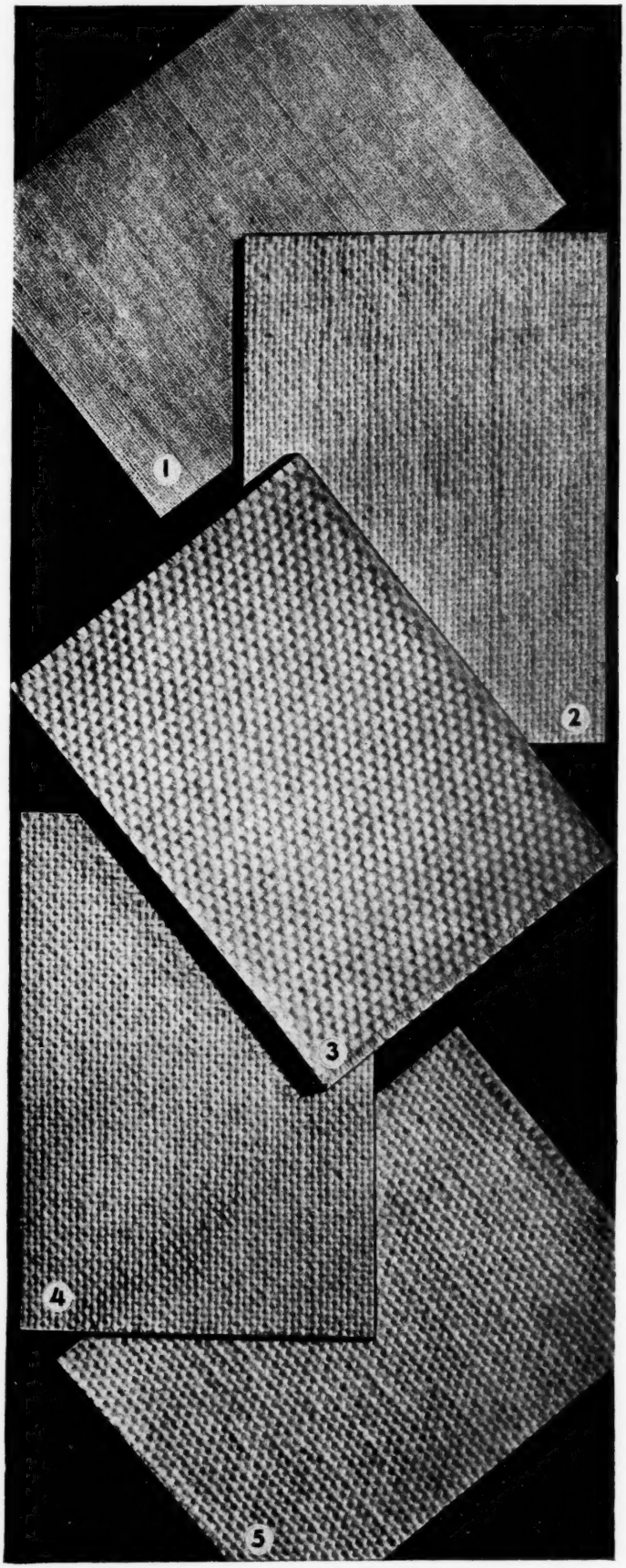
HARD RUBBER. Stocks remain scanty, and demand very active. Prices remain unchanged.

CONSUMERS' BUYING PRICES

(Carload Lots Delivered Eastern Mills)

September 26, 1935

		Prices
Boots and Shoes		
Boots and shoes, black	lb.	$0.01 /$0.01⅛
Colored	lb.	.00¾/ .00⅞
Untrimmed arctics	lb.	.00¾/ .00⅞
Inner Tubes		
No. 1, floating	lb.	.07½/ .07¾
No. 2, compound	lb.	.03¼/ .03⅜
Red	lb.	.02¾/ .02⅞
Mixed tubes	lb.	.02¾/ .02⅞
Tires (Akron District)		
Pneumatic Standard		
Mixed auto tires with beads	ton	7.50 / 8.00
Beadless	ton	11.75 /12.00
Auto tire carcass	ton	9.50 /10.00
Black auto peelings	ton	16.00 /17.00
Solid		
Clean mixed truck	ton	35.00 /36.00
Light gravity	ton	38.00 /39.00
Mechanicals		
Mixed black scrap	ton	15.00 /17.00
Hose, air brake	ton	14.00 /15.00
Garden, rubber covered	ton	13.00 /13.50
Steam and water, soft	ton	13.00 /13.50
No. 1 red	lb.	.02¼/ .02½
No. 2 red	lb.	.01½/ .01¾
White druggists' sundries	lb.	.02¾/ .03
Mechanical	lb.	.02 / .02½
Hard Rubber		
No. 1 hard rubber	lb.	.11⅛/ .11½



FABRICS
for use with
RUBBER

With many years of experience in working with the engineers and purchasing agents of the leading rubber companies, we are in position to supply both standard and special fabrics to suit your particular needs.

Seventeen mills and adequate engineering and laboratory facilities assure you of technical excellence and ultimate economy.

Fabrics illustrated at left:

1. *COLUMBUS Sheeting*
2. *WEST POINT Osnaburg*
3. *SHAWMUT Belting Duck*
4. *WEST POINT Chafer Fabric*
5. *SHAWMUT Hose Duck*

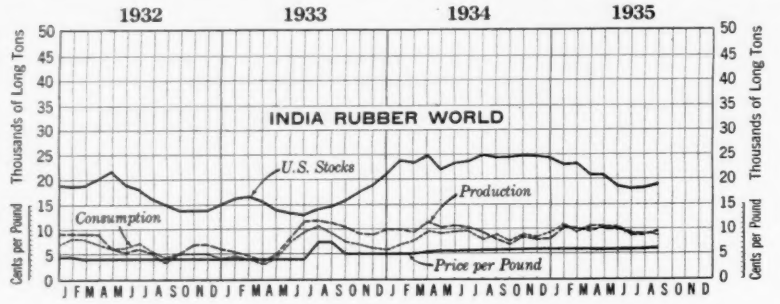
Our 538-page Handbook of Industrial Fabrics gives a very complete description of cotton, cotton manufacturing processes, uses for industrial fabrics, laboratory test methods, specifications, etc. Price $2.00. One copy free to any well-rated rubber manufacturer in the United States, upon request on company letterhead.

WELLINGTON SEARS CO.
65 WORTH STREET NEW YORK

RECLAIMED RUBBER

THE indications of better business in reclaim began to materialize in August as shown by the statistics of production and consumption for that month. Production advanced 1,136 tons, and consumption 399 tons. Stocks increased 462 tons. Reclaimers are thus gaining in plant activity and expect stronger regains in demand for the fourth quarter. A strong pick-up is noted by such large users of reclaims as automotive accessories, heels, insulated wire, battery boxes, and general mechanical lines.

Quotations on all grades are unchanged from the figures recorded last month.



Production, Consumption, Stocks, and Price of Tire Reclaim

United States Reclaimed Rubber Statistics—Long Tons

Year	Production	Consumption	Consumption Per Cent to Crude	United States Stocks*	Exports
1933	99,974	81,612	20.1	20,746	3,583
1934	110,010	100,597	22.3	23,079	4,737
1935					
January	10,465	11,261	23.9	22,291	517
February	10,072	9,374	21.7	22,989	532
March	9,741	10,549	24.8	20,637	310
April	10,315	10,466	23.4	20,521	476
May	10,223	9,938	23.9	18,541	402
June	8,590	8,710	23.8	17,932	283
July	8,421	8,396	23.1	17,810	384
August	9,557	8,795	22.4	18,272	....

*Stocks on hand the last of the month or year.
Compiled by The Rubber Manufacturers Association, Inc.

New York Quotations

September 26, 1935

High Tensile	Spec. Grav.	Cents per lb.
Super-reclaim, black	1.20	8¼/9
red	1.20	7 /7¼
Auto Tire		
Black	1.21	5 /5¼
Black selected tires	1.18	5¼/5½
Dark gray	1.35	6¼/6½
White	1.40	9¼/9½
Shoe		
Unwashed	1.60	6½/6¾
Washed	1.50	8 /9
Tube		
No. 1	1.00	13 /
No. 2	1.10	7½/7¾
Truck Tire		
Truck tire, heavy gravity	1.55	5½/6
Truck tire, light gravity	1.40	6 /6¼
Miscellaneous		
Mechanical blends	1.60	4¼/4½

IMPORTS, CONSUMPTION, AND STOCKS

CRUDE rubber consumption by United States manufacturers for August, 1935, totaled 39,242 long tons, against 36,384 long tons for July, 1935, an increase of 7.9% above July and 18.1% above August, 1934, according to R.M.A. statistics. Consumption for August, 1934, was 33,216 (revised) long tons.

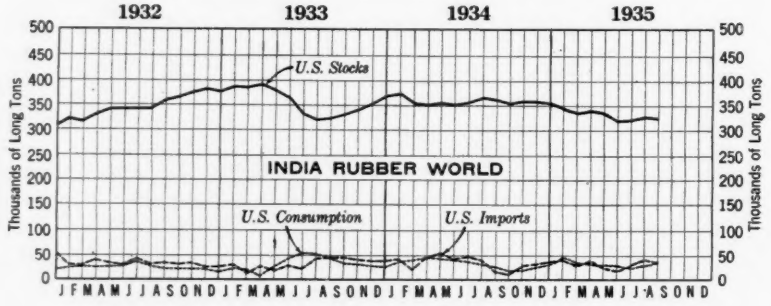
Crude rubber imports for August were 38,665 long tons, a decrease of 17.5% below the July figure of 46,880 long tons, but 16.3% over the 33,248 long tons that were imported in August, 1934.

The estimated total domestic stocks of crude rubber on hand August 31 were 329,548 long tons, compared with July 31 stocks of 330,528 long tons and 363,711 long tons that were on hand August 31, 1934.

Crude rubber afloat for the United States ports on August 31 was 47,724 long tons, against 49,018 long tons afloat on July 31 and 40,278 long tons afloat on August 31, 1934.

London and Liverpool Stocks

Week Ended	Tons	
	London	Liverpool
Aug. 31	100,972	75,733
Sept. 7	101,246	76,012
Sept. 14	101,709	76,303
Sept. 21	101,357	76,396



United States Stocks, Imports, and Consumption

United States and World Statistics of Rubber Imports, Exports, Consumption, and Stocks

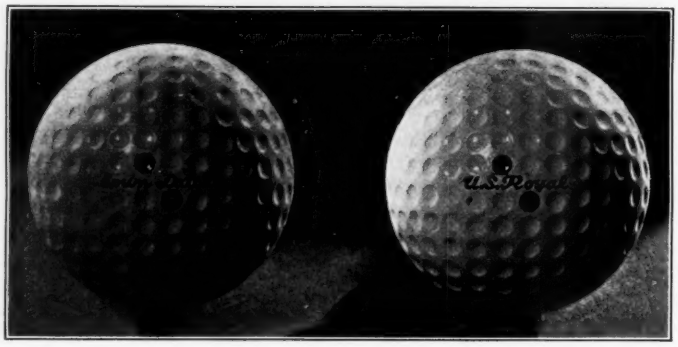
Twelve Months	U. S. Imports* Tons	U. S. Consumption Tons	U. S. Stocks Mfgrs., Importers, Dealers, Etc.† Tons	U. S. Stocks Afloat† Tons	U. K.—Public Warehouses, London, Liverpool†‡ Tons	Singapore and Penang Dealers and Port Stocks†‡ Tons	World Production (Net Exports)‡ Tons	World Consumption Estimated‡ Tons	World Stocks†‡§ Tons
1933	411,615	401,000	365,000	55,606	86,505	44,884	850,300	798,900	616,370
1934	469,484	453,223	355,000	47,644	134,927	62,142	1,016,784	959,556	678,994
1935									
January	42,059	47,103	346,084	42,066	148,337	59,609	79,860	89,216	671,954
February	35,383	43,187	337,332	42,969	155,727	57,586	75,775	90,494	658,717
March	44,041	42,620	338,700	44,485	162,012	55,100	66,686	88,112	652,659
April	43,545	44,714	334,954	37,651	165,064	48,827	76,443	80,361	651,471
May	26,866	41,568	319,281	44,375	167,745	54,740	77,911	71,643	648,991
June	38,340	36,623	320,470	55,581	171,303	51,770	74,593	65,153	647,579
July	46,880	36,384	330,528	49,018	174,227	49,958	71,059	.....	655,154
August	38,665	39,242	329,548	47,724	.....	.....	.....	.....	.....

*Including liquid latex. †Stocks on hand the last of the month or year. ‡Statistical Bulletin of the International Rubber Regulation Committee. §Stocks at U. S. A., U. K., Singapore and Penang, Para, Manaos, and afloat.

New Goods and Specialties

Fig. 1. Spraying Kelsanite on Wall of Booth

Fig. 2. Removing Kelsanite from Wall of Booth



Spun Latex and U. S. Royal Balls

Coated Spray Booths

RUBBER protective coatings for spray booths, resulting in important time and cost savings in the maintenance of such equipment, are included in the many industrial applications for Kelsanite, a liquid rubber latex composition that can be handled like paint, that has quick drying and curing properties, and is readily removable when desired.

Servicing of spray booths has always been a problem in production industries. Such booths are generally coated with some form of highly adhesive grease, etc., not easily removable. At the plant where the accompanying pictures were taken, it required the time of three men for a whole day to clean two booths, done once every four weeks.

For coating spray booths simple spray equipment is used, as illustrated. When the booth is to be cleaned, the rubber film coat can be removed either by stripping it off as shown, by hand, or by loosening the edges and inserting an air hose under the coating. With the latter method the coating, while quite adhesive to the surface, can be blown off the spray booth walls, etc., in the same manner that a balloon is inflated. Kelsan Products.

New Golf Ball of Latex

NEW from its center to the last layer of paint is the Spun Latex U. S. Royal golf ball, here illustrated, made of uniform spun latex thread. It is pure rubber and has great strength, permitting winding under terrific tension so that every bit of power possible is packed into this ball. More distance, finer feel, sharper click, and greater accuracy are among the qualities claimed for this improved product.

The significance of the spun latex thread is apparent when one realizes that it is the first real innovation in golf ball thread since the idea of winding a golf ball was introduced thirty-seven years ago. Since then, from time to time, the size of the thread was changed and the machinery for winding it improved, but the kind of thread remained much the same.

The manufacturer, United States Rubber Products, Inc., determined to make a new ball throughout, from center to cover, produced an entirely new center, a sensitive sac of pure latex filled with a liquid of permanent consistency, and wound the new power thread around it. Then the company searched for a cover material never before used on a golf ball and discovered what it sought in Java. This cover, called Tjipetir, is said to be quite formidable, for it combines toughness and resilience in addition to transmitting perfectly the finer feel and sharper click which comes from the live, active winding.

Latex Covered Canvas Glove

Sea Water Aquarium

IT IS essential for the successful operation of a marine aquarium for salt water fish to circulate the sea water uncontaminated through the tank. This condition cannot be met by the use of metal pumps and piping because the corrosive action of the sea water produces poisons that kill the fish. This difficulty is eliminated by using a hard rubber pump as a means of circulation. Such a pump constructed completely of hard rubber is obtainable.

Operated by a 1/20 h.p. motor it turns over approximately 3,000 gallons of water in 24 hours. Simple in construction, this pump is durable and practical because hard rubber is about the only material available that is not affected by contact with salt water. Aquarium Stock Co.

Utility Gloves

A PRACTICAL application of vulcanized latex consists of using this material as a substantial exterior coating for heavy cotton working gloves of the type used for handling corrosive materials or rough and sharp objects in industry, in the trades, on the farm, and in numerous other places where rough work is encountered. The glove itself is made of heavy twill with napped inner surface and is provided with a knitted wristlet. The rubber exterior extends slightly beyond the point where the wrist portion is joined to the hand. It is a tough-quality latex composition applied by dipping and is capable of extending indefinitely the serviceability of the gloves for rough work. Philadelphia Rust-Proof Co., Quaker Wares Division, 3229 Frankford Ave., Philadelphia, Pa.

Editor's Book Table

NEW PUBLICATIONS

"New Francke Coupling Catalog." John Waldron Corp., New Brunswick, N. J. This is an attractive new catalog describing and illustrating important recent changes in the Francke flexible coupling. The new catalog has been issued coincident with the new sales policy recently inaugurated whereby Francke flexible couplings and replacement parts are now offered directly by John Waldron Corp., the original manufacturer. Besides describing the important changes in design and materials, the new catalog gives complete tables of sizes for the various types, full directions for size selection and coupling service factors.

"Ross Air Heaters." J. O. Ross Engineering Corp., 350 Madison Ave., New York, N. Y. This bulletin, No. 122, describes the Ross systems of industrial ovens for drying, baking, and processing, oil and gas fired air heaters, waste heat recovery, air conditioning, heating, drying, and ventilating. These various heaters have very general application in many manufacturing industries including rubber plants in specialized lines.

"Rubber and Miscellaneous Cable." General Electric Co., Schenectady, N. Y. In this bulletin General Electric presents a compilation of information on all types of rubber insulated and miscellaneous insulated cable including data on the selection of cable, also specifications.

"Brown & Sharpe Small Tools Catalog No. 32." Brown & Sharpe Mfg. Co., Providence, R. I. This illustrated catalog with index comprises 448 pages descriptive of numerous precision items for machinists, cutters and hobs, arbors, collets and adapters, screw machine tools, miscellaneous equipment, and tables. It is a very complete reference work for engineers, draughtsmen, designers, tool makers, and all interested in the manufacture of fine machine products.

"Green Book Who's Who Directory, 1935-1936." *Oil, Paint and Drug Reporter,* 12 Gold St., New York, N. Y. The twenty-third yearly issue has appeared of this directory for buyers and sellers in the chemical, dyestuff, drug, paint, oil, fertilizer, and related industries. The book is divided into three parts. The first is concerned with chemicals, dyes, intermediates, drugs, oils, and other raw materials and manufactured products. Machinery, apparatus, and equipment are treated in the second part; while the third section consists of a directory of engineers, chemists, and technical services. This publication is as useful to purchasing agents, in fact, as a telephone directory.

The Vanderbilt News. R. T. Vanderbilt Co., 230 Park Ave., New York, N. Y. The July-August, 1935, number discusses "Low Sulphur vs. Normal Sulphur in Compounds Containing Various Loading Materials." The accompanying data and graphs demonstrate the conclusion that low sulphur gives greater resistance to aging and less tensile change at elevated temperatures. A tabulated summary of results with various ingredients is shown and several compounding suggestions made applying to various rubber products.

"Witcombings." Wishnick-Tumpeer, Inc., 295 Madison Ave., New York, N. Y. The June-July, 1935, issue of this publication discusses the work of industrial designers and packing experts; also a brief article by one of the craft on designing a paint container. Trade news, etc., add spice and interest to the number.

"Tornesit." Hercules Powder Co., Wilmington, Del. A booklet and a broadside are issued on the nature of Tornesit and its value as a paint coating for the protection of structural materials, especially of metal, against the corrosive action of acids, alkalies, weather, time, smoke, soot, fumes, gas, and other disintegrating influences. Tornesit can be applied by spraying, and its durability in withstanding destruction by the influences named is strikingly shown by the illustrations in booklet and broadside taken from tests and actual practice in industry.

"The New Jersey Zinc Activator." The New Jersey Zinc Sales Co., 160 Front St., New York, N. Y. The purpose of this bulletin, which will appear from time to time, is to report the results of experiments which are constantly in progress in the company's research laboratory on the application of zinc oxide and zinc sulphide pigments in the rubber industry. This material is presented in a form that can be readily filed for reference. A convenient spring-back binder has been prepared for this purpose obtainable free on request. The first issue, July, 1935, contains reprints of "Rate of Cure" charts that appeared in the rubber technical press during the past two years. The data reported are the result of cooperative programs with the several manufacturers of accelerators of vulcanization. The compounds were designed to exaggerate the differences between several modifications of zinc oxide, thus to serve as a guide in the selection of the most advantageous brand for a particular commercial application.

"The Givaudanian." Givaudan-Delawanna, Inc., 80 Fifth Ave., New York, N. Y. This house organ consists of four pages of new rubber deodorants. It contains actual samples of cured rubber that demonstrates the effectiveness of disguising the odor of smoked sheets.

"Broadside." General Atlas Carbon Co., 60 Wall St., New York, N. Y. Carbon black in fire hose is the subject of this interesting circular.

"Field Warehousing." Terminal Warehouse Co., New York, N. Y. This pamphlet discusses how field warehousing as conducted by the Terminal Warehouse Co. aids the manufacturer, protects the banker, and also benefits trade.

"Is Restriction Effective?" Bankers Economic Service, 91 Wall St., New York, N. Y. This study of the rubber trade situation presents a thorough discussion of the effect of rubber control upon the prices and supplies of crude rubber. It is illustrated with interesting graphs.

"Tireside Chats." Number Three. The Fisk Tire Co., Inc., Chicopee Falls, Mass. This is a letter by the president of the company, Edward D. Levy, stressing the importance of the independent tire dealer in connection with the "consumer acceptance" attitude in place of "consumer demand" in promoting sales.

"Batteries for Trucks and Buses, 1935-1936." The B. F. Goodrich Co., Akron, O. This pamphlet is devoted to a discussion of operating requirements of truck and bus batteries, description of Goodrich construction features, truck and bus battery specifications, an exposition of the battery power requirements for trucks and buses, including a lamp data table, and replacement data on truck and bus batteries.

"Manhattan Rubber Products for Industry." Manhattan Rubber Mfg. Division of Raybestos-Manhattan, Inc., Passaic, N. J. This publication is unusual for completeness as a guide to the industrial applications of rubber, being nothing short of a manual on the subject for engineers. It is replete with illustrations showing the construction and application of belting, hose, fittings, packing, friction material, molded goods, sundries and specialties, matting, rolls, tanks, and abrasive wheels. The descriptive matter is supplemented with graphs, tabulations, and standard mathematical data to facilitate engineering computations and estimates. Contractors also will value this publication for reference.

BOOK REVIEWS

"Rubber. Physical and Chemical Properties." T. R. Dawson and B. D. Porritt. Foreword by Sir Herbert Wright. A technical handbook produced by the cooperation of The Rubber Growers' Association, Inc., and The Research Association of British Rubber Manufacturers. Published by The Research Association of British Rubber Manufacturers, Croydon, England, 1935. Cloth, 700 pages, 8½ by 11 inches. Indexed. Price 45 shillings.

The declared purpose of this book to present a set of tables of detailed quantitative data of the properties of rubber, together with additional chapters dealing with other aspects of the properties of rubber, has been successfully accomplished. The main headings of the table of contents are: Latex; Coagulum; Raw Rubber; Soft Vulcanized Rubber; Sponge and Cellular Rubber, Hard Rubber; Conversion Tables and Factors; Methods of Analysis and Testing; Specifications for Rubber Goods; Associations and Institutions Connected with the Rubber Industry; Selected Bibliography of Rubber Literature; Bibliography of Authorities Cited; Glossary; Index of Mixings; Index of Subjects; Index of Names.

Under the subdivisions of chemical and physical properties are included mechanical, thermal, electrical, and optical data, and in some cases behavior of the substance discussed, as a solvent and in others its behavior toward solvents and gases. Wherever the data allow, the arrangement of the tables for a given single property is: 1. effect of external conditions; 2. chemical composition; 3. aging of the material.

To facilitate comparisons and simplify the confusion existing in the original literature all the mixings tabulated have been brought to parts by weight on the basis of rubber 100 and systematically arranged in the Index of Mixings. A series of technical notes explains the chief features of the various groups of tables and is to be found throughout the book preceding the major subdivisions.

The sponsors and authors of this monumental work have well earned the appreciation of all who consult it for authoritative data, whether as experts or consumers.

"The Economic Characteristics of Rubber Tire Production." Leonard E. Carlsmith. As stated by the author, this work was submitted in partial fulfilment of the requirements for the degree of Ph.D. under the Joint Committee on Graduation Instruction, Columbia University.

The study is based on the theory of the existence of typical economic characteristics for the business units of an industry. It attempts to describe them for a specific industry, where possible by measuring them. The conclusions of this comprehensive statistical analysis of production in the tire industry are summarized under the following headings: crude rubber, tire production, gas consumption and tire mileage, tire prices, changes in technology, cost characteristics, and corporate history and financial structure.

The authoritative data are recorded in many tabulations and charts with progress trends indicated mathematically. The study is excellently well done. However attention must be directed to an extraordinary error in placing the invention of the process of reclaiming "in about 1900" and crediting it to "Marx." The reference should be credited to Arthur H. Marks, who invented the alkali process of reclaiming rubber from vulcanized waste and patented it in 1899 (U. S. patent No. 635,141).

"Handbuch der Kautschuk und Asbest - Industrie — 1935." Atlas - Verlag G.m.b.H., Berlin-Halensee, Germany.

This directory covers the rubber and asbestos industries of Germany on the following plan:

Description of all German manufacturing concerns of the following groups: soft and hard rubber goods of all kinds, balata belting, rubber footwear, cables and insulated wires, elastic knitted and woven goods, all kinds of asbestos goods, packings, reclaims, and factice.

List of firms dealing in rubber, asbestos, and technical goods.

List of dealers in crude rubber, raw asbestos, old rubber, and waste materials.

List of names of rubber and asbestos factories as well as firms working up rubber-like materials. (Here names and addresses only are given with cross references for fuller information.)

Buyers' guide to list of firms of the rubber industry, the working up of rubber-like substances and the asbestos industry.

Buyers' guide for machinery and supplies for rubber and asbestos industry as well as branches manufacturing rubber-like materials.

Chemical composition of materials used in the rubber industry.

"Rubber Regulation and the Malayan Plantation Industry." United States Department of Commerce, Bureau of Foreign and Domestic Commerce, Washington, D. C., 1935. Paper covers, 46 pages, 6 by 9 inches. Price 10¢.

This work not only reviews developments during the early periods of restriction and particularly the different methods followed in assessment of estates as compared with assessments of smallholders in Malaya, but it also contains much information not previously available here regarding current practices in production both on estates and small holdings.

ROAD CONSTRUCTION INTERESTING RUBBER DEVELOPMENTS. *Bull. Rubber Growers' Assocn.*, Aug., 1935, pp. 353-58.

RUBBER BIBLIOGRAPHY

MODERN FOREMANSHIP. F. E. J. Hunt, *Trans. Inst. Rubber Ind.*, June, 1935, pp. 26-36.

ORGANIC ACCELERATORS AND PROBLEMS CONNECTED WITH THEIR USE IN THE FACTORY. M. Jones, *Trans. Inst. Rubber Ind.*, June, 1935, pp. 37-54.

THE COATING AND IMPREGNATION OF TEXTILES. H. P. and W. H. Stevens, *Trans. Inst. Rubber Ind.*, June, 1935, pp. 67-88.

DETERMINATION OF THE COLOR OF LATEX F. H. Cotton, *Trans. Inst. Rubber Ind.*, June, 1935, pp. 89-106.

LATEX IN THE BOOT AND SHOE INDUSTRY. H. Bradley, *Trans. Inst. Rubber Ind.*, June, 1935, pp. 107-18.

THE FUNCTION OF THE RUBBER HYDROCARBON IN THE LIVING PLANT. D. Spence and W. J. McCallum, *Trans. Inst. Rubber Ind.*, June, 1935, pp. 119-34.

EFFECT OF PRESSURE ON THE DIELECTRIC CONSTANT, POWER FACTOR AND CONDUCTIVITY OF RUBBER SULPHUR. A. H. Scott, Research Paper RP 806, *J. Res. Nat. Bur. Stand.*, July, 1935, pp. 13-34.

TWENTY-SIXTH REPORT OF THE COUNCIL OF THE RUBBER GROWERS' ASSOCIATION AND STATEMENT OF ACCOUNTS FOR YEAR ENDED DECEMBER 31, 1934. Rubber Growers' Association, London, England, 51 pages (1935).

REPORT OF THE WORK OF THE RUBBER RESEARCH BOARD, IN 1933. Rubber Research Scheme, Ceylon, 65 pages (1935).

THE RUBBER CONTENT OF TWO SPECIES OF CRYPTOSTEGIA AND OF AN INTERSPECIFIC HYBRID IN FLORIDA. L. G. Polhamus, H. H. Hill, and J. A. Elder, *Tech. Bull. No.* 457, *U. S. Dept. Agric.*, 22 pages (1934).

SOLVENTS. O. Jordan, *J. Oil Colour Chem. Assoc.*, 18, 213-28 (1935).

SPRAYED RUBBER. I. Comparison of Hopkinson, Wickham, Para, Crepe, and Smoked Sheet Rubbers. T. R. Dawson, *J. Res. Assoc. Brit. Rubber Manufrs.*, 4, 23-36, 37-51 (1935).

AGING OF RUBBER BY ACTION OF THE ATMOSPHERE. METHOD OF TEST. *Gummi-Ztg.*, 49, 573-76, 629-30, 651-52, 677-79 (1935).

DISCOLORATION OF CELLULOSIC MATERIALS BY CONTACT WITH VULCANIZED RUBBER, AND ITS CAUSES. W. Esch, *Gummi-Ztg.*, 49, 628 (1935).

EXPANDED CHLORINATED RUBBER. P. Schidrowitz and C. A. Redfarn. Appendix: The Composition of Some Chlorinated Rubbers, G. F. Bloomfield, E. H. Farmer, and C. H. Miller, *Bull. Rubber Growers' Assocn.*, Aug., 1935, pp. 330-39.

THE APPLICATION OF LATEX TO TEXTILES. R. Gaunt, *Bull. Rubber Growers' Assocn.*, Aug., 1935, pp. 345-52.

CHLORINATED RUBBER. J. Davidsohn, *Farben-Chem.*, 6, 205-208 (1935).

EFFECT OF PROTECTIVE COATINGS ON THE ABSORPTION OF MOISTURE BY GELATIN-LATEX GAS-CELL FABRICS. D. F. Houston, Research Paper RP 818, *J. Res. Nat. Bur. Stand.*, Aug., 1935, pp. 163-72.

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WANTED: RUBBER CHEMIST FOR DEVELOPMENT AND REsearch. A man experienced in modern compounding practices and factory processing. Capable of putting laboratory results into production. Address Box No. 571, care of INDIA RUBBER WORLD.

(*Advertisements continued on page* 81)

U. S. Crude and Waste Rubber Imports for 1935

	Plantations	Latex	Paras	Africans	Centrals	Guayule	Manicoba and Matto Grosso	Totals 1935	Totals 1934	Balata	Miscellaneous	Waste
Jan. .....tons	41,188	599	201	30	41	..	..	42,059	46,204	26	553	..
Feb.	33,722	388	1,208	14	51	..	..	35,383	31,032	73	194	29
Mar.	42,373	967	513	167	21	..	..	44,041	44,605	55	659	40
Apr.	41,857	1,089	531	63	5	..	..	43,545	45,662	60	644	14
May	25,256	1,106	294	60	..	50	..	26,766	47,954	55	474	16
June	36,833	860	467	80	..	100	..	38,340	49,683	135	521	20
July	45,456	973	291	46	14	100	..	46,880	41,530	84	553	25
Aug.	37,199	1,170	166	65	5	50	..	38,655	33,248	25	484	18
Total 8 mos., 1935 .....tons	303,884	7,152	3,671	525	137	300	..	315,669	.....	513	4,082	162
Total 8 mos., 1934 .....tons	329,653	8,002	1,725	106	32	400	..	.....	339,918	922	4,750	571

Compiled from The Rubber Manufacturers Association, Inc., statistics.

United States Latex Imports

Year	Pounds	Value
1931	10,414,712	$884,355
1932	11,388,156	601,999
1933	24,829,861	1,833,671
1934	29,276,134	3,633,253
1935		
Jan.	1,898,962	287,583
Feb.	1,282,941	179,583
Mar.	2,889,525	354,654
Apr.	3,854,892	415,100
May	3,197,450	380,844
June	1,324,776	152,665
July	2,563,366	303,518

Data from Leather and Rubber Division, United States Department of Commerce, Washington, D. C.

Tire Production Statistics

	Pneumatic Casings—All Types: Inventory	Production	Total Shipments
1933	7,110,456	36,243,384	35,274,970
1934	9,171,335	45,815,763	45,285,955
1935			
Jan.	10,085,737	4,487,679	3,552,737
Feb.	11,183,674	4,251,183	3,188,772
Mar.	11,325,010	4,215,214	4,078,007
Apr.	10,673,140	4,376,383	4,989,291
May	10,796,842	4,049,915	3,945,364
June	10,432,738	3,792,537	4,134,489
July	8,584,018	3,425,879	5,283,696

	Inner Tubes—All Types		
1933	6,251,941	34,044,689	33,112,472
1934	8,904,496	44,840,971	43,694,130
1935			
Jan.	9,332,489	4,131,004	3,610,371
Feb.	10,151,721	4,046,062	3,261,488
Mar.	10,094,170	3,999,030	4,043,35v
Apr.	9,864,446	4,131,658	4,319,648
May	10,296,437	3,775,145	3,347,258
June	9,748,054	3,376,082	3,903,645
July	7,765,239	3,153,068	5,111,012

	Solid and Cushion Tires		
1933	26,271	130,987	126,990
1934	34,710	197,497	187,152
1935			
Jan.	31,581	21,510	20,300
Feb.	.....	17,657	16,183
Mar.	.....	17,603	20,224
Apr.	.....	20,002	21,783
May	.....	22,533	21,150
June	.....	16,067	20,053
July	.....	21,904	20,287

	Cotton and Rubber Consumption Casings, Tubes, Solid and Cushion Tires: Cotton Fabric Pounds	Crude Rubber Pounds	Consumption of Motor Gasoline (100%) Gallons
1933...	148,989,293	512,489,423	15,880,746,000
1934...	196,069,495	697,558,218	17,063,298,000
1935			
Jan....	19,607,932	72,968,356	1,178,604,000
Feb....	18,058,726	66,463,131	1,133,378,000
Mar....	17,581,651	64,583,859	1,343,874,000
Apr....	17,944,131	71,286,972	1,515,129,000
May...	17,328,212	67,822,472	1,641,738,000
June...	15,802,601	58,152,530	1,591,128,000
July...	14,867,923	56,042,744	1,730,526,000

Rubber Manufacturers Association, Inc., figures representing approximately 97% of the industry for 1934 and 1935 and 80% for previous years, with the exception of gasoline consumption.

Foreign Trade Information

For further information concerning the inquiries listed below address United States Department of Commerce, Bureau of Foreign and Domestic Commerce, Room 734, Custom House, New York, N. Y.

No.	Commodity	City and Country
†9,233	Druggists' sundries..	Lisbon, Portugal
‡9,234	Belting, hose, tubing, and packings	Valparaiso, Chile
*9,286	Dental gutta percha in rods	Prague, Czechoslovakia
*9,349	Cup sponges	Toronto, Canada
‡9,361	Toys	Athens, Greece
†9,374	Raw and waste rubber	Barcelona, Spain
†9,377	Rubberized automobile top material...	Johannesburg, South Africa
*9,393	Rubber wheels	Johannesburg, South Africa
*9,415	Vulcanite hair combs	London, England
†9,416	Aprons, gloves, bathing caps, suspenders, belts, etc.	Amsterdam, Netherlands

*Purchase. †Agency. ‡Purchase and agency.

World Net Imports of Crude Rubber

Year	U.S.A.	U.K.	Australia	Belgium	Canada	Central Europe	France	Germany	Italy	Japan	Russia	Rest of the World	Total
1929	528,600	122,800	15,900	9,400	35,500	13,900	61,800	49,100	16,400	34,300	12,700	16,700	917,100
1930	457,400	120,000	5,400	10,700	28,800	12,100	71,400	45,800	18,600	33,000	16,700	19,300	839,200
1931	476,200	85,200	7,700	11,000	25,300	15,200	47,800	39,200	10,100	43,500	30,700	20,800	812,700
1932	393,800	43,500	12,400	9,500	20,900	15,800	41,700	45,000	15,300	56,100	30,000	26,800	710,800
1933	398,400	73,300	13,500	11,200	19,300	18,900	63,100	54,100	19,300	66,900	30,800	30,100	798,900
1934	438,941	158,481	9,642	9,116	28,439	23,427	50,405	59,330	21,403	69,934	47,272	43,166	959,556
1935													
Jan.	39,546	20,383	1,099	419	2,670	1,966	5,678	4,286	1,648	4,402	3,446	3,673	89,216
Feb.	45,999	15,609	848	399	1,558	2,547	4,670	3,513	4,357	5,585	1,810	3,599	90,494
Mar.	44,772	12,810	1,458	240	2,710	1,463	4,085	6,353	1,582	4,423	4,624	3,592	88,112
Apr.	40,061	11,574	1,150	520	1,063	1,591	3,368	5,820	1,653	6,635	3,387	3,539	80,361
May	29,962	12,498	671	982	3,929	1,665	3,900	6,050	935	5,432	1,937	3,682	71,643
June	31,410	10,253	496	1,065	1,435	1,516	3,270	4,551	*1,500	3,375	*2,500	*3,722	65,153

* Estimate. Source: *Statistical Bulletin of the International Rubber Regulation Committee.*

Shipments of Crude Rubber from Producing Countries

Year	Malaya including Brunei and Labuan	N.E.I.	Ceylon	India	Burma	North Borneo	Sarawak	Siam	French Indo-China	Philippines and Oceania: Total	Philippines and Oceania: Oceania	Africa	South America	Mexican Guayule	Grand Total
1929	457,000	255,000	80,300	7,900	5,500	7,400	11,200	4,300	9,500	838,100	900	6,300	21,300	1,300	867,900
1930	443,000	241,000	75,600	6,800	5,200	7,100	10,600	4,700	9,700	803,700	1,200	4,900	14,300	1,000	825,100
1931	423,000	257,000	62,300	5,400	4,200	6,200	10,400	3,600	11,000	783,100	900	3,500	12,200	0	799,700
1932	406,000	211,000	49,300	1,100	3,000	5,400	7,100	3,000	13,500	699,400	800	2,100	6,500	0	708,800
1933	445,800	280,800	63,800	1,500	3,400	7,800	11,100	7,000	15,900	837,100	1,100*	2,000	10,100	0	850,300
1934	467,030	379,401	79,068	5,735	5,719	11,086	17,708	17,714	19,628	1,003,089	1,233*	2,921	9,143	398	1,016,784
1935															
Jan.	41,665	18,726	6,294	1,549	945	1,238	1,574	2,614	2,575	77,180	105	467	2,108	0	79,860
Feb.	32,824	27,835	5,551	331	489	760	1,922	2,288	2,018	74,018	156	254	1,347	0	75,775
Mar.	34,047	22,402	1,720	257	471	773	1,901	2,076	1,440	65,087	82	525	992	0	66,686
Apr.	37,442	26,156	3,749	139	263	846	1,895	1,661	2,827	74,978	134	185	1,146	0	76,443
May	27,740	36,289	4,476	265	484	848	2,003	2,752	1,800	76,657	133	315	756	50	77,911
June	31,198	29,337	3,525	651	383	603	2,020	2,869	2,516	73,102	100*	393	895	103	74,593
July	37,826	20,647	4,106	351	229	1,164	1,783	1,939	1,957	70,002	100*	450*	407	100*	71,059

*Estimate. Source: *Statistical Bulletin of the International Rubber Regulation Committee.*

Classified Advertisements

Continued

BUSINESS OPPORTUNITIES

IMPORTANT PARIS FIRM WOULD CONSIDER AGENCIES FOR United States raw materials, chemicals, etc. Are in close contact with all rubber manufacturers in France and Belgium. Address Box No. 568, care of INDIA RUBBER WORLD.

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FOR SALE: ONE NO. 4 ROYLE TUBER, DIRECT MOTOR DRIVE; one Farrel Experimental Rubber Mill, 8 by 13″ Motor Drive; one 16 by 36″ Farrel Mill with 40 H.P. A.C. Motor and Thropp Reduction Gear Drive; Presses all sizes up to 60 by 60″; several Mills and Calenders up to 66″; Vacuum Shelf Driers, Werner and Pfleiderer Mixers; Banbury Mixers, Churns, etc. Send us your inquiries. What have you for sale? CONSOLIDATED PRODUCTS COMPANY, INC., 13-16 Park Row, New York, N. Y.

(*Advertisements continued on page* 83)

United States Statistics

Imports for Consumption of Crude and Manufactured Rubber

	June, 1935		Six Months Ended June, 1935	
UNMANUFACTURED—*Free*	Pounds	Value	Pounds	Value
Crude rubber	70,762,347	$7,617,093	521,516,535	$59,813,849
Liquid latex	1,324,776	152,665	14,448,546	1,770,429
Jelutong or pontianak	739.597	50,165	5,014,845	354,989
Balata	166,935	23,809	846,578	119,957
Gutta percha	188,757	30,940	2,384,928	337,642
Guayule	230,800	19,502	342,800	28,966
Scrap and reclaimed, etc.	970,035	8,798	3,369,799	38,031
Totals	74,383,247	$7,902,972	547,924,031	$62,463,863
Chicle, crude ...*Free*	18,683	$2,616	2,608,522	$592,190
MANUFACTURED—*Dutiable*				
Rubber soled footwear with fabric uppers ...*pairs*	90,310	$20,630	462,825	$119,497
Rubber toys	117,899	15,808	707,890	87,994
Druggists' sundries, n. e. s.	.....	9,888	.....	51,824
Combs, hard rubber...*number*	105,066	6,174	327,474	18,483
Golf balls ...*number*	67,380	12,097	294,156	52,185
Tennis and other rubber balls ...*number*	211,844	10,686	2,544,999	120,673
Tires ...*number*	1,904	682	14,130	10,720
Other rubber manufactures	.....	37,828	.....	225,458
Totals	.....	$113,793	.....	$686,834

Exports of Foreign Merchandise

RUBBER AND MANUFACTURES				
Crude rubber	1,172,799	$153,595	15,910,720	$1,886,948
Balata	21,682	6,391	117,302	30,559
Gutta percha, rubber substitutes, and scrap	4,600	1,150	28,440	4,880
Rubber manufactures	.....	831	.....	11,445
Totals	.....	$161,967	.....	$1,933,832

Exports of Domestic Merchandise

RUBBER AND MANUFACTURES				
Reclaimed	634,015	$36,461	5,642,117	$279,425
Scrap	5,844,761	118,676	28,055,484	518,403
Rubberized automobile cloth, *sq. yd.*	41,067	18,032	271,109	141,262
Other rubberized piece goods and hospital sheeting...*sq. yd.*	83,437	39,723	564,967	224,708
Footwear				
Boots ...*pairs*	5,666	11,311	49,268	106,751
Shoes ...*pairs*	18,790	6,451	96,439	47,842
Canvas shoes with rubber soles ...*pairs*	27,009	12,858	357,784	168,786
Soles ...*doz. pairs*	2,684	4,653	14,297	23,361
Heels ...*doz. pairs*	47,424	23,896	220,729	125,056
Soling and top lift sheets	9,807	1,858	104,218	18,620
Water bottles and fountain syringes ...*number*	14,060	5,229	86,157	31,223
Gloves ...*doz. pairs*	6,231	11,060	28,944	62,240
Other druggists' sundries	.....	29,549	.....	179,723
Balloons ...*gross*	12,513	10,918	128,012	112,214
Toys and balls	.....	5,730	.....	25,525
Bathing caps ...*doz.*	4,138	7,065	35,101	64,567
Bands	14,237	4,826	109,708	38,114
Erasers	29,447	13,360	168,550	94,745
Hard rubber goods				
Electrical goods	170,076	14,433	861,032	81,575
Other goods	.....	13,276	.....	94,106
Tires				
Truck and bus casings, *number*	13,671	241,918	99,356	1,771,136
Other automobile casings, *number*	53,993	464,760	368,733	3,147,764
Tubes, auto ...*number*	47,458	60,780	319,483	423,485
Other casings and tubes, *number*	2,984	12,768	21,219	75,700
Solid tires for automobiles and motor trucks...*number*	307	9,710	2,745	76,982
Other solid tires	16,818	3,499	554,041	77,499
Tire sundries and repair materials	.....	30,889	.....	192,511
Rubber and friction tape	49,628	12,178	274,527	72,624
Belting	276,960	122,603	1,256,818	620,029
Hose	327,901	101,074	2,183,134	645,447
Packing	100,862	36,873	748,017	251,286
Thread	80,540	46,964	582,954	354,855
Other rubber manufactures	.....	116,632	.....	862,767
Totals	.....	$1,650,013	.....	$11,010,331

Low and High New York Spot Prices

All Prices in Cents per Pound

	September		
	1935*	1934	1933
PLANTATIONS			
No. 1 thin latex crepe	11½/12¼	15¾/16¾	7½/9¼
No. 1 ribbed smoked sheet	11¼/12	14¾/15⅞	6⅝/8¼
PARAS			
Upriver fine	9⅞/10½	10¾/11¾	8¾/9¾

*Figured to September 26, 1935.

Rubber Goods Production Statistics

		1935	1934
TIRES AND TUBES*		June	June
Pneumatic casings			
Production	*thousands*	3,793	4,212
Shipments, total	*thousands*	4,134	5,071
Domestic	*thousands*	4,061	4,956
Stocks, end of month	*thousands*	10,433	9,913
Solid and cushion tires			
Production	*thousands*	16	21
Shipments, total	*thousands*	20	19
Domestic	*thousands*	19	19
Stocks, end of month	*thousands*	30	31
Inner tubes			
Production	*thousands*	3,376	3,974
Shipments, total	*thousands*	3,904	5,150
Domestic	*thousands*	3,840	5,058
Stocks, end of month	*thousands*	9,748	8,532
Raw material consumed			
Fabrics	*thous. of lbs.*	7,055	17,716
MISCELLANEOUS PRODUCTS			
Rubber bands, shipments	*thous. of lbs.*	227	238
Rubber-proofed fabrics, production, total	*thous. of yds.*	...	3,156
Auto fabrics	*thous. of yds.*	303	478
Raincoat fabrics	*thous. of yds.*	...	1,320
Rubber flooring, shipments	*thous. of sq. ft.*	400	449
Rubber and canvas footwear			
Production, total	*thous. of prs.*	4,151	4,478
Tennis	*thous. of prs.*	1,391	1,566
Waterproof	*thous. of prs.*	2,760	2,912
Shipments, total	*thous. of prs.*	3,002	3,613
Tennis	*thous. of prs.*	1,774	1,980
Waterproof	*thous. of prs.*	1,227	1,633
Shipments, domestic, total	*thous. of prs.*	2,964	3,561
Tennis	*thous. of prs.*	1,742	1,933
Waterproof	*thous. of prs.*	1,222	1,629
Stocks, total, end of month	*thous. of prs.*	19,358	20,945
Tennis	*thous. of prs.*	5,642	6,846
Waterproof	*thous. of prs.*	13,716	14,099
Rubber heels			
Production	*thous. of prs.*	19,105	19,412
Shipments, total	*thous. of prs.*	18,694	20,513
Export	*thous. of prs.*	356	426
Repair trade	*thous. of prs.*	5,578	3,946
Shoe manufacturers	*thous. of prs.*	12,760	16,142
Stocks, end of month	*thous. of prs.*	34,250	38,146
Rubber soles			
Production	*thous. of prs.*	3,567	4,772
Shipments, total	*thous. of prs.*	3,509	5,050
Export	*thous. of prs.*	8	10
Repair trade	*thous. of prs.*	380	241
Shoe manufacturers	*thous. of prs.*	3,121	4,799
Stocks, end of month	*thous. of prs.*	3,887	4,955
Mechanical rubber goods, shipments			
Total	*thous. of dollars*	4,422	4,424
Belting	*thous. of dollars*	1,026	990
Hose	*thous. of dollars*	1,383	1,583
Other	*thous. of dollars*	2,012	1,852

*Data for 1934 are estimated to represent approximately 97% of the industry.

Source: *Survey of Current Business*, Bureau of Foreign & Domestic Commerce, Washington, D. C.

London Stocks, July, 1935

			Stocks, July 31		
LONDON	Landed Tons	Delivered Tons	1935 Tons	1934 Tons	1933 Tons
Plantation	6,625	†5,474	99,189	50,438	41,132
Other grades	4	6	37	52	46
LIVERPOOL					
Plantation	‡*3,194	*1,410	*74,915	*55,414	*58,681
Total tons, London and Liverpool	9,823	6,890	174,141	105,904	99,859

*Official returns from the recognized public warehouses.
†Includes 893 tons transferred to Liverpool
‡Includes 691 tons transferred from London: the balance (202 tons) in transit at end of month.

Imports by Customs Districts

	July, 1935 *Crude Rubber		July, 1934 *Crude Rubber	
	Pounds	Value	Pounds	Value
Massachusetts	7,806,629	$857,231	6,215,131	$713,152
New York	85,203,010	9,584,168	71,907,594	7,642,638
Philadelphia	2,068,660	244,294	1,281,155	132,736
Maryland	1,899,797	204,147	4,170,792	386,434
New Orleans	56,000	6,121	2,424,895	243,076
Los Angeles	10,171,684	1,003,861	9,058,389	882,655
San Francisco	574,096	66,577	345,343	38,071
Oregon	33,600	3,696	.....	.....
Ohio	.....	.....	185,545	17,588
Totals	107,813,476	$11,970,095	95,588,844	$10,056,350

*Crude rubber including latex dry rubber content.